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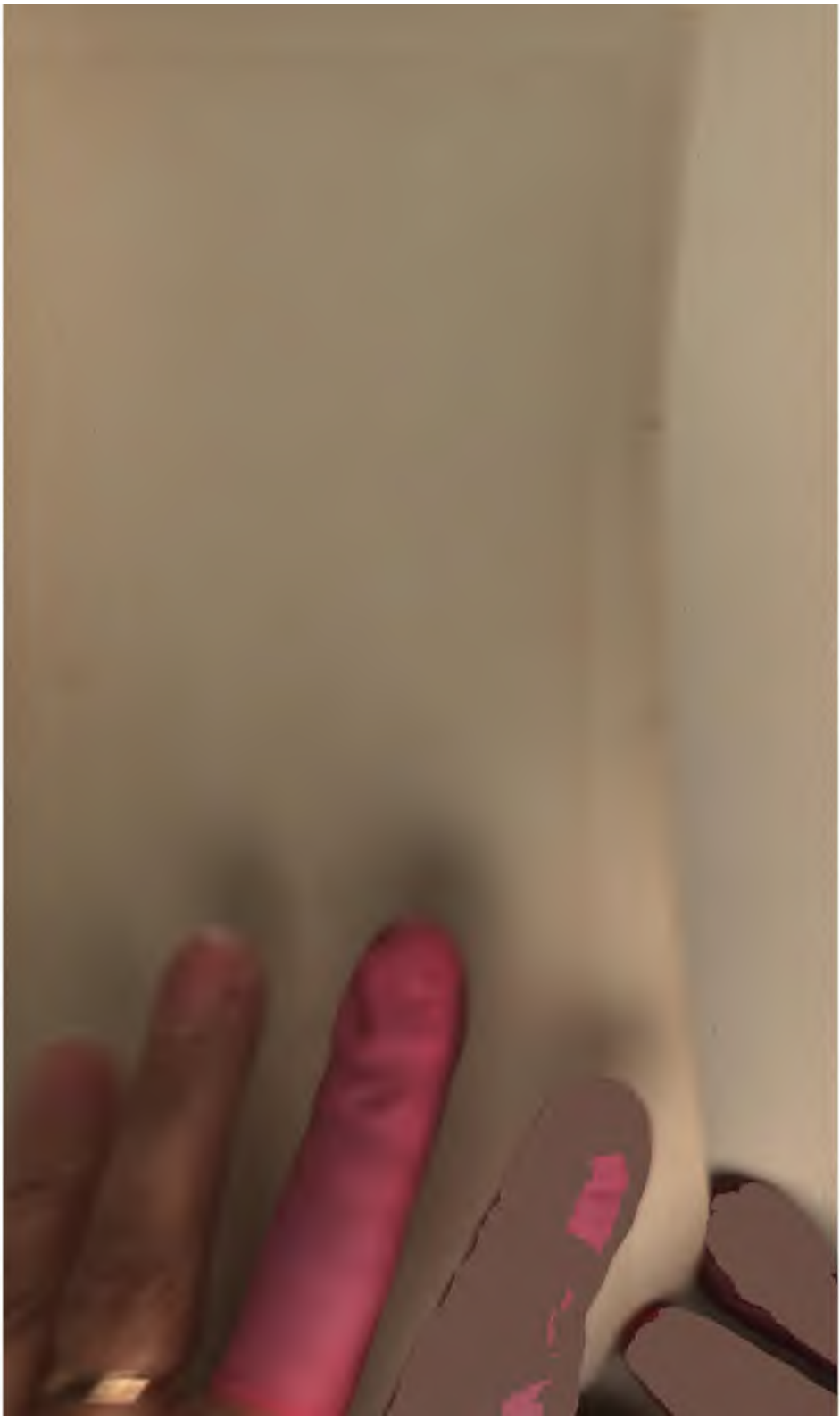

THE VALUE OF

URETERIC MEATOSCOPY IN OBSCURE DISEASES OF THE KIDNEY.

" Who to the life an exact piece would make
Must not from others' work a copy take."

COWLEY, *to the Royal Society.*

THE VALUE OF

URETERIC MEATOSCOPY IN OBSCURE DISEASES OF THE KIDNEY.

A STUDY IN CLINICAL AND OPERATIVE SURGERY.

BY

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PREFACE.

No operator, I take it, explores a kidney without having first exhausted all possible methods of ascertaining the cause and extent of its failure and the health of its fellow-gland. Expert radiography, microscopy, bacteriology, are all insisted upon and undertaken before any attack is made upon an organ which is perhaps above all others the most essential to life. It is allowed that each of these methods, although each has its limitations, can generally afford the surgeon some definite and valuable indication in the diagnosis and the prognosis of the disease. But it is not acknowledged—and by many the suggestion is even ridiculed in England—that an electric-light examination of the orifice of the ureter of the diseased kidney can also render signal service to the operator. Not only is the bladder declared free from all cause of renal suffering, but the condition of the diseased kidney and ureter can be surmised, and the opposite kidney declared healthy or the reverse.

In some measure I attribute my low mortality* in renal surgery to the routine examination of the ureters;

* My renal operations up to September 14th, 1903, are as follows:

200 explorations of the kidney	.	10 deaths.
100 removals of the kidney	.	8 „
120 removals of stone from the kidney	.	8 „

83885

but in mentioning this I do not wish it to be gathered that I follow the shallow policy of considering a low mortality after operation any indication of sound or successful surgery. It is the immunity from pain, the restoration to a healthy urinary function, and the power to resume active habits of mind and body, which are the real criteria of operative success. These ideals will be the more nearly approached in proportion as our knowledge becomes more exact, our operative procedure more precise; and both these advances will, I feel sure, be materially assisted by skilled cystoscopy.

I have formulated certain rules for ureteric meatoscopy, and have given examples from an experience which has ranged over ten years. I do not pretend that I have exhausted so interesting or so fruitful a field; I merely place this brief review of it before the profession for criticism and correction, and I trust that it may be found sufficiently reliable to be the basis of more extended work in the same direction.

E. HURRY FENWICK.

14, Savile Row, London;
October, 1903.

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CHAPTER I.

URETERIC MEATOSCOPY; THE CYSTOSCOPIC APPEARANCES WHICH INDICATE DISEASE IN THE KIDNEY OR URETER.

THE precise diagnosis of diseases of the kidney has advanced materially in the last decade. The progress is mainly due to the introduction of more exact methods of research. Foremost among such modern methods rank cystoscopy of the ureteric orifices, radiography of the kidney and ureter, ureteric catheterisation,* bacteriology, the phloridzin test,† and perhaps Koranje's method of ascertaining renal insufficiency by noting the freezing-point of the blood.‡ These, singly or in combination, have caused the surgery of the kidney to assume a more purposive aspect; and although digital exploration of the organ is still necessary, it is seldom that the surgeon approaches the kidney without some appreciation of what he may be called upon to do. He will probably know beforehand whether he will have to remedy the effects of acute or chronic unilateral Bright's disease, or to remove an oxalate of lime calculus, or to anchor the gland, or to remove it entirely for suppurative processes, for tubercle or cancer.

To gain even this prescience, however, he will have to skilfully employ one or more of the methods I have mentioned, and he will, I think, be inclined to concede that cystoscopy of the ureteric orifices is the most often valu-

* I should like to express my opinion that although Kelly's method of examining the female bladder is valuable, yet it is unsuited for ureteric meatoscopy. The bladder must be distended for the purpose of examining the orifices—a condition which is not easily effected by merely elevating the pelvis.

† "Some Observations upon the Value of the Phloridzin Test for Estimating the Functional Capacity of the Kidneys," Watson and Bailey, 'Boston Med. and Surg. Journ.,' vol. cxlvii, No. 23, pp. 609—614.

‡ Koranje, "Contribution to the Diagnosis of Surgical Diseases of the Kidney," 'Casper Monatsberichte,' 1899, Bd. iv, Heft 1, p. 1. (Appendix.)

able, and that it supplies more information than the other procedures mentioned. Ever since the introduction of cystoscopy I have employed it systematically in renal diseases, and I have become more and more impressed with its diagnostic accuracy. I cannot help acknowledging that much of my confidence, and indeed that much of my success in renal surgery, depends upon it. I venture, therefore, to deal with it somewhat in detail in the following chapters.

The Importance of the Cystoscope in the Exact Localisation of Obscure Renal Disease.

Many clinical facts may be cited to show how difficult is the exact localisation of surgical disease of the kidney. Every one of the cardinal symptoms may be misinterpreted. For instance, to ascertain the true causation of renal pain is often an impossibility without the cystoscope.

A large percentage of local renal suffering originates in the bladder. As examples the following may be mentioned :—a vesical epithelioma narrowing the ureteric orifice, causing dilatation of one ureter and pelvis, produces pain in the corresponding kidney.* Septic inflammation ascending the ureter from a vesical source † induces renal

* *Examples.*—Mr. A., æt. 65 (vol. O. P. iii, 375), sent me by Dr. S. Fenwick, complaining of pain in left kidney, pain at left pubic spine, and in left side of penis. On cystoscopy a dense ring of non-ulcerated epithelioma was seen surrounding left ureteric orifice, which was red and gaping. I prognosed death from uræmia, and advised no operation. Patient did well for a year. He then consulted a surgeon, who diagnosed enlarged prostate and washed out the bladder. Death took place six days later.

Mr. W., æt. 60, was sent to me in 1899 by Dr. Kirkwood, of Peterborough, with very severe pain in the right kidney and along the right ureter. There was also much bladder irritation and pain. Pain had commenced fourteen years previously in the right kidney. He had been seen by Prof. Ziegler and diagnosed to have oxalate stone in the right kidney. Bladder irritability had been noticed for eight years. He had been repeatedly sounded for stone, but negatively. On examination with the cystoscope the right ureteric orifice was seen surrounded with a ring of dense carcinoma. This was contracting and closing the channel. A supra-pubic drainage, which was carried out eight months later, established the diagnosis of epithelioma of the right lower ureter.

† Such causes are too common to need illustrating.

pain; even villous papilloma, or ulcer near the lip of the ureteric orifice, gives rise to sympathetic unilateral kidney pain.* These, and other vesical disorders discoverable by the cystoscope, are so able to produce a one-sided renal pain as to mislead the clinician and divert his attention to the kidney from the real focus of the disease, which lies in the bladder.

Then, again, a fair number of cases of renal pain is due to calculus arrested in the lower ureter. This arrest can be surmised in some instances on using the cystoscope.

Conversely.—Renal disease may induce such agonising bladder symptoms as to deceive the most experienced physician. Unilateral renal tuberculosis descending the ureter, or chronic renal abscess, or descending pyelitis of calculous origin, or stone fixed in the lower orifice of the ureter,—all these induce difficulty of urination, great irritability of the bladder and penile pain; and yet each can be inferred, and sometimes accurately diagnosed by cystoscopy of the ureteric orifices.

Then there is a large group of cases which exhibit no symptoms to indicate the locality of the disease. Only blood or only pus or only chyle appears in the urine. Such symptomless hæmaturia, pyuria, and chyluria can only be successfully attacked after cystoscopy has demonstrated the source of the blood, pus, or chyle. It is sorry surgery to undertake a series of exploratory incisions in order to discover and treat an area of latent disease in a tract of so great an extent as the genito-urinary, when a simple cystoscopy is sufficient to reveal the site of the disease.

I have seen patients with symptomless hæmaturia and pyuria, who have had extensive supra-pubic operations performed in order to enable the surgeon to catheterise both ureters, and I confess that in several instances the procedure did not reflect any credit upon the surgeon, nor did it tend to elucidate the location of the disease.

Moreover, in certain instances an obstinate supra-pubic

* Compare example on page 103.

fistula was left, and the misery of the patient much increased.

Then, again, there is no doubt that the appendix in both sexes, and the pelvic sexual organs in women are fruitful sources of error in the diagnosis of urinary complaints. Often a right-sided descending calculus, or a movable kidney has been mistaken for an appendicitis, and *vice versâ*, and many a time an inflamed ovary or an uterine fibroid has excited such marked vesical symptoms that the bladder has been energetically but fruitlessly treated, whilst the peccant organ has been left alone, and yet cystoscopy often proves sufficient to eliminate such sources of error.

The cystoscope also sometimes enables the surgeon to detect latent disease of the kidney, of which there has been no clinical evidence. Even obsolescent tubercle of the kidney may be inferred upon certain visual grounds, and much operative danger is thereby avoided.*

Lastly, there is a great field at present opening to the renal surgeon,—a field demanding skilled use of the cystoscope. I refer to the operative treatment of the earlier stages of chronic Bright's disease. It is contended by Newman, Harrison, and Edebohls that certain cases of albuminuria associated with casts and other evidence of renal degeneration have been benefited by operation on one kidney. The improvement has been noted on fixation of the organ (Newman), on relieving tension by cutting through the capsule (Harrison), and on decapsulation and inducing a collateral circulation (Edebohls).

Why such a result should follow operation on one kidney, in a disease hitherto regarded as constitutional and bilateral, is not explained.

I have proved and taught for years that changes analogous to, and indistinguishable from chronic Bright's disease are often not only unilateral, but are even localised to small areas in one kidney. If this disease has to be combated by operation, the affected kidney must be

* Compare Chapter IX on "The Ureters in Renal Tuberculosis."

localised, and that can only be effected in the male by means of the cystoscope armed with a ureteric catheter.

Points in the Technique of Ureteric Meatoscopy.

1. The form of cystoscope.

There is no necessity to use any special cystoscope, still less to employ that recommended by instrument makers—the posterior wall cystoscope. Such an instrument is rarely of use. Let an ordinary anterior wall cystoscope be selected.

2. A *medium-filled bladder* is essential to success.

Let the bladder be filled comfortably with clear medium. Any over-distension flattens out the ureteric orifice and obliterates the lips. Half-distension causes the mucous membrane to roll up and the ureteric lips to thicken. Both extremes must therefore be avoided by the novice. With experience the effect upon the orifices * of over-distension and half-distension will be carefully noted, for valuable inferences may be drawn from such an examination.

3. The pelvis must be elevated.

It is necessary always to put a sand-bag or book under the pelvis. The amount of medium used for distension should be noted, and the height of the pelvic cushion employed in case of any re-examination.

4. The detection of the orifice. Let the cystoscopist be sure he is examining the ureteric orifice, for many and varied are the pitfalls.

When the cystoscope is felt to have entered the bladder let it be turned completely over by rotating the ocular end. Let the posterior edge or base line of the trigone be at once determined.

This is easily accomplished in moderate health, for the dark colour of the trigone marks it off sharply from the sandy white of the adjoining posterior wall, and its base line is upraised in the form of a slight

* These effects are best produced by a Nitze irrigating cystoscope.

ridge—"the plica ureterica." Variations in the colour of the trigone due to disease are recognisable without difficulty. Let the beak of the cystoscope be carried along the base line of the trigone, right or left, by moving the ocular end of the instrument laterally in the opposite direction. One ureteric mouth will come in view towards the narrow outer extremity of the base line—the "plica ureterica,"—the projection of which is caused by the fusion of the longitudinal muscles of the two ureters.*

The orifices vary in different individuals; women who have borne children have larger orifices.

In health and in moderate distension of the bladder the ureteric orifice is a faint flesh-coloured line. The low ridge on which it opens is of the colour of the buccal membrane of the lip: a twig of an emergent vessel may or may not be seen. If the bladder is distended to its full limits the orifice loses its line-like aspect. The lips separate slightly and become taut from the strain, an oblique depression appears, and it now resembles the opening of a Turkish slipper (Fig. 5). Moreover the colour of the lips changes to a white; the vascular twig disappears.

5. The position of the beak. It is a point of some importance to look *down* at the orifice, and not sideways. If the opening is looked at in profile, the cystoscopic lamp must rest on the posterior wall of the bladder, and if the lamp is kept burning a surface eschar is sure to be produced, which will mislead the cystoscopist in his just estimate of the case (*vide* page 12).

* As soon as the ureter pierces the outer and middle coats of the bladder its muscular coat, which is about one fiftieth of an inch in thickness, is thus disposed:—The more internal and strongest of its longitudinal fibres are directed transversely and join the corresponding fibres of the other ureter (the muscles of C. Bell) to form a low ridge, the plica ureterica, which makes the base line of the trigone, while the remainder are continued down over the trigone and blend with the submucous layer. The circular fibres of the ureter appear as a kind of sphincter around the ureteric orifice.

Clinical Notes.

(*a*) *The diastole and systole of the ureteric orifice.*—The phenomena connected with the discharge of urine from the orifice of the ureter cannot be too carefully noted, for much information of the working activity of the corresponding kidney can be thus obtained.

Immediately preceding the efflux from an active, healthy kidney, the end of the ridge on which the ureteric orifice opens will generally swell, drawing itself up for an effort; a muscular wave passes then rapidly from without inwards over the tiny area, the orifice opens, a stream of clear fluid issues, mixing with the medium in the bladder just as glycerine mixes with water; the orifice remains patulous for an instant, then it contracts firmly, and its size diminishes considerably.

(*b*) *An absent ureteric orifice.*—In rare instances the ureteric orifice cannot be discovered, for it is absent.* This does not necessarily indicate a congenital absence of the corresponding kidney, but it certainly demonstrates that the corresponding kidney is *a useless* organ, existing may be as a shell.† The cystoscopist may be inclined to argue that because the corresponding renal region is the seat of continuous or intermittent pain, that the kidney must be secreting. This is a fallacy. Useless shell-kidneys ache though they may not secrete. They inflame and suppurate, though they may be shut off from all ascending infection from below. Compare (*e*).

* If the case be a male the surgeon should also see if both testicles are present. If one testicle is congenitally absent on the same side as the absent ureteric orifice, the chances are that the kidney is also absent.

† Now that side of the bladder which corresponds to the dead kidney is weaker than the other, and in two cases out of three it will rupture on this side low down if it is ruptured by violence. I believe the trigone affords a clue to this weakness. The ureteric bar is low, and flat on the same side as the useless kidney; the lateral muscle wall is thinned, slack, and baggy; but these are signs difficult of cystoscopic appreciation, and I cannot as yet rely upon them.

(*c*) *Hidden ureteric orifices.*—Ureteric orifices are difficult to find some months after nephrectomy has been performed, provided the lower ureter was not dilated at the date of operation. They are also "buried" in those bladders with basal swelling due to prostatitis.

(*d*) *A displaced ureteric orifice.*—If a kidney and ureter affected by chronic tuberculosis becomes inflamed, the kidney retracts under the ribs and the ureter shortens. In consequence of this the ureteric orifice gets pulled out of its place (*vide* page 171).

(*e*) *Extra-vesical termination of the ureter.*—Owing to some defects in development the ureter may not terminate at the usual position in the trigone, and in rare instances it has been shown to end in the posterior wall of the bladder. Commenting on such cases, Grosglik says, "In Civiale's,* Walther's,† Galaski's ‡ cases, and in some others, the anomaly consisted in a supernumerary ureter which *coursed behind the bladder and ended directly at the colliculus seminalis;* the normal opening of the supernumerary ureter was situated on the floor of the bladder opposite the internal orifice of the urethra in Wrany's case.§ In the observations of Heller ‖ and Osterloh ¶ we are, in fact, dealing with a supernumerary ureter ending blindly, but in both cases the ureters ran along the posterior wall of the bladder, while the blind ends did not penetrate the muscular layer of the bladder. An

* Civiale, 'Traité pratique sur les maladies des organes génito-urinaires,' 1841, Bd. ii, S. 467.

† Walther, 'Einige Krankheiten der Niere und Harnblase,' Berlin, 1800; cit. nach Englisch, "Ueber primäre Hydronephrose," 'Deutsche Zeitschrift für Chirurgie,' 1879, Bd. xi, S. 16.

‡ Galaski, 'Ein Fall von doppeltem Harnleiter mit getrennten Ausmündungen in der Blase,' Inaug.-Diss., 1869; cit. nach Englisch, l. c.

§ Wrany, l. c., "Autor veröffentlichte zwei Fälle, deren einer, als zu den von uns beschriebenen Anomalien gehörend, von mir in der Casuistik citirt wurde."

‖ Heller, 'Deutsches Archiv für klin. Medicin,' Bd. v, S. 287; citirt nach Schwarz, l. c., S. 207.

¶ Osterloh, 'Jahrbuch der Gesellschaft für Natur- und Heilkunde in Dresden,' 1872-3; citirt nach Schwarz, l. c., S. 207.

analogous case was published by Meschede;* in this case the anomaly concerned a single ureter, the blind end of which was attached to the outer surface of the posterior bladder wall.

In the female the ureter has been known to end in the urethra, vulva, or vagina,† but these latter conditions, though they concern the urinary surgeon, do not engage his attention in cystoscopy.

(*f*) *Double ureteric orifice.*—This is a rare condition, but one of importance, as it not infrequently denotes disease in the corresponding kidney. The entire subject is treated more fully in Chapter III, page 33.

Clinical Note on an Absent or an Unrecognisable Orifice.

An absent or an unrecognisable ureteric orifice is a serious crux to the surgeon who contemplates operative procedures on the opposite side. He will obtain but little information if he adopts the expedient advocated by Knowsley Thornton of examining with the hand through a peritoneal incision the kidney whose ureteric orifice is

* Meschede, 'Virchow's Arch.,' Bd. xxxiii, S. 456; cit. nach Schwarz, l. c., S. 198.

† Kelly ('Gynæcology,' vol. ii, p. 421) quotes a case of Dr. E. G. Orthmann, of Düsseldorf, in which the cystic dilatation of the lower end of a misplaced ureter simulated a vaginal cyst. The patient was twenty-seven years old, and presented a circumscribed cystic tumour of the anterior vaginal wall, which she thought was a prolapse of the uterus. This gradually kept increasing in size, and was associated with drawing pains in the left side, extending around into the small of the back. The tumour was elastic and circumscribed, and occupied the lower third of the vagina down to within a finger's breadth of the external urethral orifice. It could be pushed back, but returned on the least straining. Careful examination showed that it had no connection with the urethra or bladder. At the operation the thick walls of the tumour were dissected out up to a long pedicle on the left side, which was bared three to four inches, when it became evident, from the way in which the tumour emptied itself upwards, that there was a communication with the ureter above. The pedicle was tied and cut, and retracted into the cellular tissue out of sight. The convalescence was undisturbed.

Schwarz has written fully on these conditions, "Über abnorme Ausmündungen der Ureteren," 'Beiträge zur klin. Chirurgie,' 1896, vol. xv.

absent; for even *plump* kidneys * may be quite useless for the body need, or they may be so reflexly sensitive, that they may become suppressed in function upon the slightest shock. I advise a large dose of methylene blue and Contrexeville, and a re-examination of the apparently vacant ureteric area. If no blue efflux is seen the prognosis should be grave, and all operative interference on the opposite kidney should be gently purposeful, and stop short of nephrectomy.

A Few Difficulties.

(*a*) Occasionally the surgeon may deem the ureteric orifice to be absent, but hesitates to decide because there is much œdema or puffiness in the ureteric area. It is more than probable that the orifice is merely buried between two œdematous folds. Let a good dose of methylene blue be administered and the efflux will be stained, and the colour will lead to the detection of the opening.

(*b*) *Difficulty in saying which mouth is being inspected.*— If the base is looked at *sideways,* the knob on the ocular rim of the cystoscope must be noticed, for it points to the same side as the prism, and hence it indicates the ureteric orifice to which the attention is directed. The ocular rim must be *fixed.* Sometimes the entire cup becomes loosened and slides, and a grave diagnostic mistake can be made.

But if the orifices are being examined from above, that is, from a completely rotated cystoscope, and the prism is at some distance from the object examined, then especial care must be taken to be certain as to which orifice is under view, for both appear near together. This warning is not superfluous in cases of "symptomless" hæmaturia, for in these cases the surgeon is called upon to operate on

* I have on several occasions removed kidneys, large and healthy to the touch, the ureters of which were absolutely blocked by old fibroid change, and hard to the touch, the pelvis being a mass of fat and the cortex riddled with old abscess sacs containing obsolete tubercle or putty-like material. Compare Chapter IX.

one kidney upon the visual examination of the bloody ureteric efflux.

(*c*) *Changes in the size of the orifice.*—A certain amount of stress is laid upon the patency of the orifice—whether it can be "*looked into*," so to speak. It must be remembered in estimating this that some orifices contract under stimulation of the light or heat of the cystoscopic lamp, or even from the character of the medium used to wash out the bladder; but the spasmodic closure passes off in a few minutes.

Under very *deep* anæsthesia—dangerously deep—the sphincter-like action of the orificial muscles becomes paralysed and the orifice gapes. The anæsthetist should be instructed to remove the mask for a minute, a watch being kept on the orifice.

(*d*) *A minute hernia or saccule simulating an open ureteric orifice.*—There is some danger of a novice mistaking a minute depression or the mouth of a tiny saccule at the side of the ureteric area for the open mouth of the ureter. In other words, the novice may diagnose a dilatation of the ureter when only slight sacculation of the postero-lateral wall of the bladder exists. If the rule of following the plica ureterica to either end, be adhered to, the chance of this serious blunder occurring is much lessened. It is moreover safer to wait for the efflux, for this removes all doubt.*

It is a point worth remembering that back pressure upon the bladder expends its force differently in different bladders. In some its effect is mainly noticeable in the bladder; in others in the ureters and pelves of the kidneys. This is generally admitted, but it is not realised that the *slightest back pressure, occasioned by the slightest*

* I have been several times exercised in my mind by the appearance of a *thrust out* and a *suck in* of the puriform contents of a little saccule. At each inspiration there has been a churning out of the puriform contents of a little diverticulum, and at each expiration blobs of pus and urine have rushed back. I mistook this at first for the efflux of an open dilated orifice, but it only occurs with respiration, and a "suck" back is rarely noticed into a patent ureteric orifice.

impediment to the urinary stream, even one so slight as to be unnoticed by the patient, produces visual hypertrophic changes in the bladder and ureters. The sequence of the *visual* effects of *slight* back pressure can be roughly formulated thus:—if back pressure is slight, it is compensated by changes in the urinary tract behind it. These consist, usually, either in slight sacculation and fasciculation of the posterior and lateral walls, or by the opening out and gaping of the ureteric orifices. If the bladder becomes slightly sacculated the ureters escape; if the ureters give way before the force, the bladder escapes herniation. Moreover one ureter gives way before the other ureter. And, curiously enough, the cystoscopist may notice one ureteric orifice patulous from back pressure and the bladder area around it free from fasciculation, whilst the other ureteric orifice is small,* and the area around fasciculated and sacculated.

If, then, we notice a small dark hole in the position of the orifice of the ureter, the rest of the postero-lateral wall is examined for the absence or presence of other saccules.

A Serious Fallacy.

Scorches with the beak.—Cystoscopists differ in their mode of examining the ureteric orifice. Some are content to view it laterally, and for this purpose they unwittingly lay the beak of the cystoscope on the posterior wall. A scorch of the surface almost invariably ensues † if the inspection be prolonged. Probably the cystoscopist now lifts the beak to examine the other ureteric orifice, and catches sight of the scorch erosion he has just made. Its reddened edge and greyish centre deludes him into believing the case is one of ulcerated bladder. The

* Vol. v, O. Per. 336, 311, 147.

† There is no reason why the bladder should be burned by the lamp. All that has to be done to avoid this accident is so to hold the beak that it is *surrounded* by water, and the heat evolved is carried off by the surrounding medium.

diagnosis being at fault, the treatment fails. It is no fancied pitfall. I have caused such erosions when demonstrating the orifice to a class, and I have seen it several times happen in the practice of others.*

One of the most annoying and serious mistakes I have made is worth placing on record. A male patient complaining of left renal pain was brought to me a week after a surgeon had cystoscoped him. I found a large, red-edged, sloughing ulcer situated to the side of the left ureteric orifice. I diagnosed a deep scorch with the lamp; but I noticed the adjacent ureteric orifice œdematous, large, protuberant, and gaping. It never entered into my mind that the propinquity of the scorch would cause such changes. I at once said, "There is a renal calculus two inches up the ureter," and passing my finger into the rectum I felt a rounded little body in the ureter, and another a little higher up. I immediately made a laparotomy, with separation of muscles, expecting to be able to slide the supposed stones up the ureter to the iliac fossa, and extract them through the incision used for tying the common iliac. My chagrin may be imagined when I found the small rounded bodies to be part of a chain of hard glands accompanying the ureter, and evidently enlarged by the same cystoscope scorch which had inflamed the orifice of the same. I promptly examined the kidney, found it small and very movable. I fixed it, and the patient was relieved of his pain.

Much of this danger is now removed by the use of the new "cold" lamp made by Lowenstein, of Berlin. It seems to owe its comparative lack of heat to being sheathed in asbestos.

* The symptoms of scorch erosion are penile pain for three days, slight and constant, increased at the end of urination, a slightly increased frequency of the act and a trace of pus, may be a tiny slough in the urine. It often takes three weeks to heal; but this, and of course the severity of the symptoms, is in proportion to the depth of the burn.

CHAPTER II.

THE A, B, C OF URETERIC MEATOSCOPY.

THE following chapter contains a brief summary of those clinical inferences which, I submit, may be drawn from the character of the ureteric efflux and from the appearances of the lower orifice of the ureter. It forms an introduction to the more advanced study of those changes in the efflux and contour of the ureteric outlet which accompany special diseases of the kidney and ureter.

Clinical inferences based on abnormalities in the phenomena of efflux will be first considered.

1. AN ACCENTUATION OF THE SYSTOLE AND DIASTOLE.

Every healthy ureteric orifice moves slightly as the urine reaches the opening and issues from it. This movement is mainly muscular, being the last effort of that rhythmic vermicular contraction which starts at the renal pelvis, traverses the ureter, and expends its final energy on the circumureteric area of the bladder. When, however, the action is strongly marked, the lips being drawn in, the jet of urine issuing forcibly, and the muscular contraction sweeping in a well-marked wave along the plica ureterica and on to the trigone,* the inference is that for some cause or other that ureteric tube is hypertrophied and slightly dilated.

The cystoscopist should look for evidence of hypertrophy of the terminations of the longitudinal muscles of

* The wave follows the line of the continuation of the longitudinal muscular coat of the ureter, which is prolonged and spread out on the trigone (*vide* footnote p. 6).

the ureter. This may be sometimes found in the inter-ureteric muscles which form the plica ureterica. If then that half of the plica ureterica on which the ureter opens *appears* hypertrophied—that is, if it is seen to stand out as a bold ridge like a miniature biceps—a slight confirmation of the inference that the ureteric tube is hypertrophied is obtained.

In estimating hypertrophy of a plica it should be remembered that this ridge may be swollen by general inflammatory œdema of the base, in which case a glance at the trigone will serve to detect a general basal swelling; or the ridge may be thickened merely as part of a general hypertrophy of the bladder—a fact easily ascertained by comparing it with the opposite half of the ridge and the increased muscular mouldings of the adjacent posterior wall. Given, however, a thickening of *one* side of the plica, combined with hyper-activity of the orifice and an increased volume and strength of efflux, it nearly always indicates hypertrophy and slight dilatation of the ureteric tube.

The question of which the cystoscopist now seeks a correct solution is, For what is this hypertrophy needed? Is it to overcome a narrow ureteric orifice? If that opening is normal or large we should examine the ureter, for there must be some reno-ureteric cause for the hypertrophy.

Two clinical conditions present themselves as probable factors in the production of hypertrophy of the ureter with a normal-sized outlet.

(1) An increase of urinary work in the kidney. This occurs when the activity of the other gland is diminished or destroyed, and an abnormal volume of urine has to be secreted and ejected by a single kidney.

(2) Some body which the reflex sensitiveness of the ureter is labouring to rid itself of—particles of phosphate of lime or urates, or blood, or even a small prickly calculus, the clinical evidence of the last being reno-ureteric pain (not necessarily colic).

2. Absence of Efflux in "Healthy" Kidneys ("Dry" Ureter).

Sometimes no efflux will be noticed issuing from an apparently healthy orifice. It is unsafe to draw conclusions from this condition, which may be designated as "dry" ureter.

Kidneys often "rest" in the work of secretion. Moreover in some cases the renal secretion is very markedly under nervous influence. Thus fright, anticipation of pain, or exposure appears to inhibit the action, and the consequence is a dry ureter.

This is especially so in young girls about the age of seventeen. I have often had to make "surprise" examinations in order to note the ureteric efflux. Thus everything is prepared without the knowledge of the patient, Contrexeville water is administered, and the examination is rapidly carried out under cocaine,* otherwise the ureters may be found "dry."

3. The Efflux.

(*a*) *A strong, rapidly-repeated efflux of a clear urine from* **both** *orifices.*—A very rapidly recurring jet on both sides, the orifices being normal, usually denotes the previous exhibition of a diuretic or hyper-secretion due to disease.

(*b*) *A rapidly-recurring jet of clear urine issuing from* **one** *orifice*—and that being of large size and the other small—indicates a slight dilatation of one pelvis and one ureter from over-work, the other being deficient in activity.

Note.—A very active kidney generally has a slightly dilated ureter, a dilated pelvis, its secretion is pale, and of median specific gravity.

Such a kidney resents any shock, and if the operator is forced to interfere with it, he will do wisely to limit his exploration as far as possible to a digital examination †

* The exhibition of ether is best avoided, for this seems to curtail renal activity.

Mem.: the fingers will discover a canoe kidney, that is one with a

of the unopened renal pelvis, and *without section* of the gland. Especial care is taken to examine the insertion of the ureter into the pelvis with the eye. It is often oblique.

(*c*) *Large-volumed, rapidly-repeated, opaque effluxes.*—The opaque effluxes temporarily obscure the light, but they are always a welcome object, for their volume indicates that the major part of the kidney is active. They are of three characters.

(1) A bloody-coloured efflux, of large volume and rapidly repeated, denotes a small pelvic source of hæmorrhage, an over-active, mainly healthy kidney, artificially stimulated by the blood or the cause for the blood, and a healthy ureter. One sees such a condition most commonly in the hæmaturia of chronic interstitial nephritis.

For examples *v.* page 57.

(2) A rapidly recurring efflux of muddy puriform urine indicates an over-active kidney, stimulated to increased exertion by mild pyelitis, and possibly by a calculus fixed near the ureteric orifice of the renal pelvis (*v.* page 123).

Mrs. T. G—, æt. 32, painless pyuria, had had bladder irrigated for weeks. Mud rapidly issuing in jets from a large ureteric orifice (right). Right nephrolithotomy; renal pelvis dilated a little; an oxalate embedded near orifice of same. Three months later occasional *quiet* efflux from right ureteric orifice; urine still a little muddy. Left ureteric orifice making efforts, but "dry." Final health perfect.

(3) If the efflux is rapid, unilateral, and creamy white (the urine being chyluric), there is, in all probability, a communication between the dilated lymphatics of the renal pelvis and that reservoir.

M. C—, æt. 30. Chyluria with pain in *left* kidney. Creamy jet rapidly repeated from right ureteric orifice; flow rapid and profuse. The left not working; only occasionally a sluggish puff of clear urine. Mem.: cured by tabloids of thymol.

(*d*) *A "trickle" efflux* repeated at long intervals.

The urine issues slowly and scantily from the ureteric hollowed-out hilum. The sinus of such a kidney is easily and thoroughly explored by turning in the slack of the pelvis and feeling the calyces.

orifice in the form of a trickle. I never care to see this symptom for it denotes an inefficient kidney.

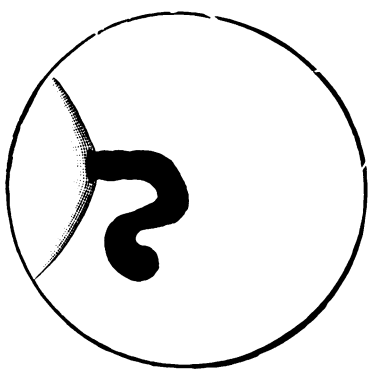
(1) *A puriform trickle.*—If it is a *pyuric* trickle the kidney is crippled by inflammation. The only favourable form is when the trickle is caused by the arrest of stone in the lower ureter (*q. v.*, page 149), in which case the kidney may recover part of its activity in time after the removal of the block to the channel.

(2) *A bloody-urine trickle* denotes that a small part only of a kidney, crippled by chronic interstitial nephritis, is acting, or more rarely that a deficient urine supply is passing over and washing a clot in the pelvis of the kidney.

(3) *A blood trickle.—A trickle of blood* denotes a slight kidney pelvis bleeding, the renal tissue being inefficient or replaced by growth.

(*e*) *Solid effluxes.*—Solid effluxes are always grave indications of pressure in the pelvis of an inactive kidney (either temporary or permanent). After clearing the orifice they break off in lengths according to their consistency, and these sections slide into the post-trigonal depression.

FIG. 1.



Cystoscopic diagram of blood-clot being forced out of right ureter.

(1) *Blood.*—When blood issues in clots from the ureter without any fluid efflux of urine (Fig. 1) it points to

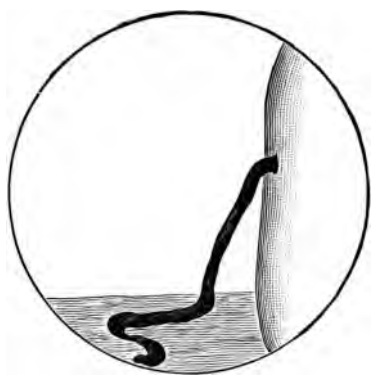
profuse hæmorrhage of the renal pelvis; it is nearly always due to malignant growth breaking through from the cortex into the pelvis. *Vide* illustration, page 85.

(2) *Blood and débris* forming a solid efflux is rare; they are often grey in colour from the admixture of the necrotic material.

(3) *Pus.*—Solid tapes or rolls of white pus are indications of the secretory death of a suppurating kidney. This condition is so unusual that I append an illustration of it; compare other cases, page 126.

F. D—, æt. 33, had been treated by a "specialist" for an urethral discharge, which had appeared suddenly and, as the patient asserted, causelessly. The diagnosis of gonorrhœa was pertinaciously adhered to, but the prescribed injections did not remove

FIG. 2.



Cystoscopic diagram of a "pipe" of soft putty-like pus being pressed from left ureter.

the urethritis, nor had the medicine any effect upon the extraordinary *malaise* which the patient experienced. I was asked to see him, and noticed that his urine was acid, sp. gr. 1024, that it contained a quarter pus and was not tuberculous, that there was no pain, and no subjective urinary symptoms. His temperature was 100·5°. The left kidney felt slightly enlarged. He sweated profusely at night, and had lost one brother from phthisis. I placed him at rest and the pus suddenly ceased. It reappeared on his getting up again, but in lesser quantities. The temperature rose each evening, but the severest questioning could only elicit the

statement that he only felt "an occasional windy feeling in his left loin."

On cystoscopy I and several others saw a thick white pipe of inspissated pus being forced out of the left ureteric orifice. This was just like a slender tube of soft macaroni paste being pressed through its gauge. As it slid down the bladder wall—for the pelvis was raised—it arranged itself in coils like the rolls which treacle forms when dropped from a spoon (Fig. 2). I cut into the left kidney and released an abscess in the cortex containing six ounces of thick dirty yellow fœtid pus. At the bottom of this abscess was the rounded opening of a deep calyx, and in the latter a curved "dirt stone."* The kidney never discharged any urine.

Clinical Inferences based on Marked Abnormalities in the General Appearance (Shape, Size, and Colour) of the Lower Ureteric Orifice and its Surrounding Area.

There is no doubt that in a certain proportion of cases of disease of the renal pelvis and ureter a distinct alteration in the shape, size, and colour of the corresponding lower ureteric orifice does ensue. I am sure that such changes are worthy of careful study, for they afford the surgeon a valuable indication to the site and sometimes to the character of the disease.

But I do not wish it to be inferred that the lower ureteric orifice *invariably* sympathises with the renal pelvis, or that it proves an infallible guide to renal disease; still less do I wish to convey the idea that the absence of any orificial change indicates a healthy upper urinary tract: I merely lay stress upon the fact that in a fair proportion of cases of disease of the renal pelvis the appearance of the lower orifice of the corresponding ureter will afford a valuable clue to the presence and nature of the disease.

The following axioms may be permitted.

(1) There is no doubt that the vesical orifices of the ureters differ in aspect in different individuals. But so

* Are these calcareous plates analogous to the fibroid cretaceous deposits found in healed phthisis? Are they evidences of chronicity in attempts at healing?

slight are the variations in appearance, that a type can be easily fixed upon to represent the normal.

(2) Abnormal appearances, if they are to be relied upon at all for inferential diagnosis, must be marked; nay, more, I think they should be *striking*.

(3) No expression of opinion concerning the abnormality of this or that urinary orifice should be accepted unless the skilled cystoscopist has examined and compared both sides.

Clinical Inferences.

A. A MARKEDLY VASCULAR ORIFICE DENOTES INCREASED VASCULARITY OF THE PELVIS OF THE CORRESPONDING KIDNEY.

The lips are normal in size, but the edge of the orifice is roughened, and the interior may be of a dull red, just as if it has been lightly smeared with dull red blood. Such a condition is frequently seen in *recent* profuse renal hæmorrhage—the hæmorrhage having ceased. It is not constant; some of the severest renal hæmorrhages have emerged from the healthiest looking orifices. The absence of this appearance, therefore, does not imply that there has been no recent hæmorrhage, it merely points to the absence of large clots, and the epithelial abrasion which ensues as they are extruded from the orifice.

Should *well-marked* vessel twigs radiate from the very edge of one vascular ureteric orifice, the inference that the corresponding kidney has been the source of the recent renal hæmorrhage receives corroboration.

Still more certain is it, if the lips and the corresponding part of the *plica ureterica* be slightly swollen and finely stippled with red (as in the early stage of acute urethritis), for in this case clots have passed along that ureter as well as fluid blood, and have, by their size, evoked a slight ureteritis. This last condition is clinically corroborated by the history of the pat ent having suffered from slight or severe renal pain or renal colic,

according to the size of the clot and the duration and difficulty of its transit along the ureter (for illustrations see page 79).

B. AN ELONGATED TURGID ORIFICE LIKE A LONG CONGESTED MEATUS OF THE PENILE URETHRA, DENOTES DILATATION OF THE CORRESPONDING RENAL PELVIS, AND MARKS A TENDENCY FOR THE URETER TO DILATE FROM ABOVE DOWNWARDS.

If on contrasting two ureteric orifices it is noticed that one appears elongated, the lips swollen, and the opening a darkly congested furrow (Fig. 3), and not as normally obtains—a slit (Fig. 4), then the cystoscopist may infer

FIG. 3. FIG. 4.

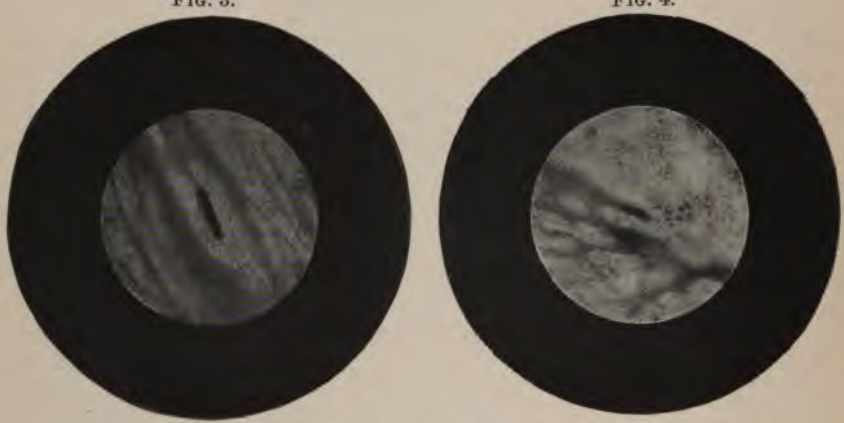


FIG. 3.—An elongated turgid orifice, indicating a dilatation of the corresponding renal pelvis.
FIG. 4.—A normal ureteric orifice.

that the pelvis of the former kidney is dilated,—it may be slightly or enormously, for the length of the lips of the orifice is no measure of the dilatation of the renal ureteric pelvis. The pelvis *only* may be dilated and the ureter normal, in fact, I have often seen the entire upper third of the ureter white and healthy to the eye, though the pelvis has been distinctly dilated and the vesical orifice of the ureter elongated and turgid.

I have found this condition most often in women, but that may be merely an error in numbers.*

It must, however, be remarked that cases of dilated renal pelvis exist without any alteration being noticed in the size of the corresponding ureteric orifice.

Hence the rule, I submit, should run as follows:

Marked elongation of the ureteric orifice,—the lips being turgid, swollen, and approximated and the orifice a furrow, denotes some dilatation of the corresponding renal pelvis, also that the urinary channel is probably beginning to dilate from the kidney downwards. The absence, however, of this particular shaped orifice does not denote that the renal pelvis is not dilated.

C. An Orifice like an Oval Arch is the First Sign of an Early Grade of Dilatation of the Ureter from below upwards.

Occasionally the cystoscopist will notice one ureteric orifice, even both, to be unduly large and white; the lips no longer exist as lips. The external commissure is raised to form an oval arch; the internal commissure is depressed to form the floor of the threshold of the channel. The orifice resembles in miniature the inguinal ring with its pillars, and the channel, which the eye cannot discern, passes

* *Examples:*

Mr. D.	Oper., iv, 160.	Left, a swollen, elongated lipped furrow. Left renal pelvis dilated, full of sarcoma.
Mrs. T. P.	„ v, 306.	Left, a swollen, elongated furrow. A dilated pelvis, appreciable to the finger; hollowed.
Mrs. E.	„ v, 242.	Left, a swollen, elongated furrow. A largely dilated pelvis.
Miss R.	„ v, 295.	Left, a swollen, elongated furrow. A largely dilated pelvis.
Mrs. G.	„ v, 310.	Right, a swollen-lipped, elongated furrow. Kidney moveable, hollowed.
Mr. F.	„ v, 331.	Right, a swollen-lipped, elongated furrow. Kidney slightly hollowed.

obliquely upwards under the arch (Fig. 5). I believe this condition is one of the first signs of dilatation of the ureter, the orifice assuming this arch-like appearance when the bladder is very full and the pillars are stretched. The appearance changes a little in systole. As the pillars contract prior to the ejection of urine from the ureter the

Fig. 5.

"An arched" or inguinal ring-shaped orifice. The first sign of dilatation of the ureter.

oval assumes a round shape, and the colour becomes a duller red. It is often noted in those cases in which one ureter is giving way under back pressure, or in which there is only one kidney working for the needs of the body.* Pathologically it will be found that when one kidney is doing double work its entire ureter is dilated.

* G.	O. Per.,	iv, 509.	Right ureter arched; pain occasionally along right ureter, lower third. Back pressure from enlarged prostate.
Mrs. C.	„	v, 17.	Right arched. Right kidney doing all work.
E.	„	v, 152.	Left arched. Left kidney the only kidney, and it was hydronephrotic.
Miss R.	„	v, 376.	Left arched. The right was moveable and hydronephrotic.
Mr. N.	„	v, 162.	Left arched. The right was moveable.
Mr. S.	„	v, 163.	Left arched. The right not working.

A

An open "golf-hole" ureteric orifice denoting dilatation of the ureter.

B

An ulcerated edged "golf-hole" orifice denoting dilatation of the ureter and pyelitis.

Bale & Danielsson, Ltd., Lith.

D. THE GOLE-HOLE LIKE URETERIC ORIFICE IS AN INDICATION OF A DILATED URETER (Pl. I, figs. A, B)..

(*a*) *Non-inflamed.*—In some cases the ureteric orifice will be noticed to be distinctly open. The orifice is round, and the edge thick. The central channel being in shadow, will be black, but the lips have disappeared, and the mouth is so obviously open that the cystoscopist can almost hazard a guess what size catheter can enter the orifice without unduly stretching it. The opening may vary in size from o to O, *but it is not inflamed.* The inference which may be safely drawn is that there is a fair degree of dilatation and atony of that ureter. If the edge of an open ureter is noted to be wavy or crenated in shape, it indicates a high grade of atony, but not necessarily a high grade of dilatation; in fact, the conformation of the ureteric orifice in any case is no guide to the degree of dilatation of the ureter, for that tube may be the size of a child's small intestine, and yet the orifice of the ureter may be only moderately patulous, and flaccid.

(*b*) *Inflamed and ulcerated.*—If, however, the edges of the *patulous* "holed" orifice are red, swollen, and excoriated (Pl. I, fig. B), pyelitis is obviously present, and it may be safely argued that destructive pyelo-nephritis of that side exists in addition to the dilatation and atony of the ureter. Here, again, the appearance of the ureter conveys no knowledge of the amount of destruction which has taken place in the kidney, nor of the working capacity of the gland. Generally such a kidney is useless, and it will not be advisable to leave it. One of the most striking cases I have had was sent to me in 1897 by Dr. Gordon Dill of Brighton and Dr. Ivers, of Tonbridge. The right ureteric orifice was the size of a 12 E catheter gauge, and outof it came an occasional clump of pus (Fig. 6). I removed a small kidney riddled with abscesses, evacuating at the same time a large abscess which lay between it and the liver. The ureter was a large slack open tube filled

with phosphatic *débris*. If the orifice is large, and the edge is of a dull white like inlaid wax whilst the surrounding area is reddened, the operator may expect to find periureteritis. In which case the ureter may be

FIG. 6.

An unusually large patulous orifice, denoting atony of pelvis and ureter.

found transformed into a thick cord like a giant vas deferens, a condition which is typical of a rare form of reno-ureteric tuberculosis. This will be considered more particularly under the head of ureteric tuberculosis (page 160).

E. SMALL, PUCKERED, DISTORTED, WARPED URETERIC ORIFICES DENOTE PRE-EXISTING EROSIVE URETERITIS.

Occasionally an orifice will be noticed to be very small and irregular in outline, perhaps divided by a bridge of tissue into two minute holes. This is nearly always due to the scarring of pre-existing ulceration, and the ulceration is always the outcome of inflammation of the ureter or pelvis (Fig. 7). It might be thought that a small stone lodged at the orifice would cause ulcerative changes and subsequent distortion in the outline of the opening. This is a possible cause, but I have never met with it, for a prolonged retention of stone partly in and

partly out of the ureteric orifice is extremely rare.* Occasionally the puckered orifice will be red, a sure sign of recent acute attack of ureteritis or pyelitis. The adhesion of an ulcerated lip may be so extreme as to dam

FIG. 7.

A narrow orifice with a puckered, irregular outline, denoting a past stage of severe pyelitis.

back the urine, and thus lead to one form of so-called cyst of the ureter (*vide* page 38).

F. ORIFICIAL PAPILLOMATA MARK CHRONIC IRRITATING DISCHARGES FROM THE URETER.

Small papillomata or cockscomb warts, in size from that of a pin's head to that of a small pea, are but seldom seen on the lips or edges of the ureteric orifice. When situated at the orifice they are indications of irritation of a severe type in the corresponding ureter or kidney. It is especially important to note this because the surgeon is apt to consider the hæmorrhage complained of (for there is usually hæmaturia) to be of vesical origin, and advise removal of these sentinel warts. To adopt such a course will only prove disappointing, for the surgeon will be unable to remove such minute patches cleanly.† In the first place

* See cases of this, p. 146.

† Unless of course he uses a speculum and a strong head light.

he will hardly be able to feel them, and if he scrapes the ureteric area haphazardly he will merely inflame, by contiguity, the ureter of the damaged kidney, and consequently accelerate the disease of which the warts are only the terminal expressions. I have known these sentinel warts to occur in ureteric stone (four instances), in growth of the kidney (two cases), and in chronic interstitial nephritis.

A Fallacy.

The everted ring of mucous membrane in partial prolapse of the ureter is nearly always tufted with isolated papillæ, or distended bottle-shaped glands. These *look* like papillomata. They are mere evidence of œdema and gland blockage.

G. Œdema of the Ureteric Orifice is a Sign of Stone Arrested in the Termination of the Ureter, or of Acute Descending Renal Tuberculosis.

Œdema of the ureteric orifice is a difficult condition to describe, but when seen its character is obvious and its appearance is not easily forgotten.

The actual orifice is indistinguishable; it is lost, buried in a small irregular mound of œdema; and as the light strikes the side of the protuberance the rays transilluminate the edge and show its colourless myxomatous aspect to perfection. Here and there fine red striæ mark the position of vascular twigs. Its position, its comparative minuteness, its extreme translucency, the glisten of the œdematous surface, and the fine markings or creases which cover the convex surface should be sufficient to prevent the cystoscopist from diagnosing villous growth.* The condition is a rare one. I have met with it in descending stone, when the calculus had blocked the vesical section of the ureteric tube, and by its size had interfered with the blood-supply (p. 144). I have also met with it in acute descending renal tuberculosis (p. 183).

* I have seen cystoscopists fall into this error.

A

B

Eversion of the ureteric orifice (seen from in front and from the side).

Bale & Danielsson, Ltd., Lith.

H. Conical Protrusion of the Ureteric Orifice as a whole usually points to Renal Stone which is evoking Colics.

I have already drawn attention to the slighter forms of a protruding orifice under the head of ureteric cone,* but it is necessary, for the sake of completeness, to allude to it here.

In certain cases of stone in the kidney there is very slight swelling of the lips, so that the orifice protrudes as a whole as an obtruncated minute cone. If the bladder is not fully distended the conical swelling is more marked. In the centre of the flattened apex will be noticed the open ureteric orifice. The light shines through the cone, causing it to assume the red colour of vascularity. The clinician will remember that the appearance is not common, that the "cone" is very small, that it must not be confused with the œdematous orifice, for this latter not only involves the orifice but the surrounding area as well; nor with eversion or rolling out of the mucous membrane of the lower end of the ureter, see below (I); and finally that when it is marked it indicates some focus of irritation in the renal pelvis, which will probably prove to be an aseptic stone.

I. Prolapse of Ureteric Orifice.—The Minor Grade consists in mere Eversion of the Ureteric Orifice (Pl. II, A and B).

The cystoscopist will occasionally remark a little eversion of the mucous membrane of the ureteric orifice. It is a condition readily appreciated, and it may be noticed only during the relaxation of the diastole of the ureter, or it may be present even during the systole. It is analogous to the rolling out of a lax rectal mucous membrane in defæcation, and it may be construed as being caused by reflex expulsive efforts of the ureteric muscles to rid the

* 'Handbook of Electric Cystoscopy,' p. 101.

tube of some irritant. I have met with it in several cases of stone in the lower ureter. In the minor grades it may right itself spontaneously in the course of months; thus in one case, a male patient, in whom the prolapse was severe and the eversion about an eighth of an inch in length (Pl. II), a spontaneous cure was noted and maintained for a year.

Ureteric prolapse (like the rectal eversion in a horse after defæcation); entire recovery.—H. L—, a young soldier æt. 20. Sent to me by the late Staff Surgeon H. Jackson, in January 1898.

A four months' history. Onset: diurnal frequency and glans pain after micturition; then nocturnal frequency; then a quantity of blood towards the end of the act. Since this attack the hæmaturia has recurred at intervals. Exercise had no appreciable effect on the pain or blood. There was no lumbar or groin pain. He noticed that his urine stream stopped suddenly. Urine 1018, acid pus; no tubercle, no testis or prostatic tubercle.

Cystoscopy.—Orifice of left ureter a swollen, tumid ring of prolapsed everted mucous membrane, exactly like the anus of a horse after defæcation. From the centre of this, where the orifice would be, issued a white thread of pus, which overlapped the ridge and fell on to the inter-ureteric bar and trigone. No other pathological change in bladder. Cause of condition unknown. To be placed on hexamethylene tetramine, gr. v, ter die, for three months.

Cystoscopy.—March, 1898.—No prolapse. Orifice sound and small.

Report: March, 1899.—In good health.

March, 1900.—In good health.

March, 1901.—Lost trace of patient.

J. Prolapse of the Lower Ureter, the Severe Grade.

Cases are on record in which the eversion and prolapse of the mucous membrane of the ureter through its orifice were so marked as to deceive and tempt the surgeon to ligate the protrusion in the belief that it was a vesical growth. Thus Mr. Davies Colley* reports the case of a female infant aged eighteen months in which such an ureteric prolapse was found.

* 'Path. Trans.,' vol. xxx, 1879, p. 310.

A soft mass of a dingy reddish-purple colour, about one inch long and half an inch thick, was seen protruding from the vulva. The child had been lately noticed to strain a good deal on making water. The flaccid reddish protrusion was readily unfolded, and ascertained to be the shape of a funnel, the neck of which was placed within the urethra. The aperture of the funnel formed a circle one and a quarter inches in diameter; its neck, which lay within the urethra, was not quite half an inch in diameter, but when it was not upon the stretch, it shrank to so small a size that it did not fill up the whole of the urethra, which was not unusually large. The edge of the funnel was about an inch distant from the meatus urinarius, except posteriorly, where there was an interval of half to two thirds of an inch. The walls of the funnel were nearly a quarter of an inch thick, soft, shining, and of a reddish-purple colour, and resembled in appearance congested omentum. A probe could be passed into the bladder through the meatus, and could then be moved nearly all round the neck of the funnel, but not quite, from which it appeared that a part of the funnel grew from the posterior wall of the urethra. The little finger was introduced into the vagina, and the os uteri could be felt in its normal position. A female catheter was next passed into the funnel. It went up about five inches towards the left side of the abdominal cavity, and gave exit to four or five ounces of very fœtid pus. The catheter was introduced into the urethra, and drew off about two ounces of clear, inodorous urine. The neck of the protrusion was ligatured, and the mass cut off. The child died nine days after. Autopsy revealed that the mucous membrane which surrounded the orifice of the left ureter had prolapsed, probably under the combined influence of a renal calculus and great straining, and had been ligated and removed.

I do not know of any case of severe prolapse of the ureter being diagnosed by the cystoscope and operated upon. It is true that one or two isolated cases in the male are to be met with in the literature, labelled "prolapse of the ureter," and that recent authors have accepted the diagnosis without question, and have quoted the cases, but careful analysis of the description rather disqualifies the term of "prolapse."

Several of the so-called "prolapsed ureters" are evidently due to ballooning of the ureteric orifice—the so-called cystic swelling of the lower ureter, a condition very

dissimilar to prolapse. I have entered into this subject somewhat fully in the next chapter, page 38, but I may mention here that it consists in the appearance of a long, finger-shaped, cyst-like mass from the position of the orifice of the ureter, that the orifice is pin-point in size, and therefore bulged forward by the pressure of urine behind it, that the swelling is usually of a pale grey or glistening white, being composed of thin mucous membrane, and that not infrequently small stones are found in the cyst or in the ureteric tube. It merely needs cutting off, and this may be done without *danger,* but a true prolapse is very different. Here the orifice of the ureter is *large;* the ureteric mucous membrane slips through and turns inside out. If it is cut through to any great extent the tube may retract, and subperitoneal or peritoneal extravasation of urine ensue.

CHAPTER III.

RARE ABNORMALITIES IN THE TERMINATION OF THE LOWER SECTION OF THE URETER.

CERTAIN rare conditions, principally of congenital origin, which affect the lower orifice of the ureter have now to be considered. They will only be met with occasionally in cystoscopy, but their recognition is of importance in the conservative surgery of the kidney. The following three rare abnormalities merit a brief notice. The ureter may be double throughout its course, and it may then terminate in two orifices, a double patent orifice; or, secondly, one of these canals may end "blind" under the trigone, and then it will dilate into a cyst, which will mark and complete its end; or, thirdly, one of the ureteric orifices may be so minute that the pressure of the urine on the lower section of the tube swells out its termination into a bulb or cyst, the so-called "cyst of the ureteric orifice."

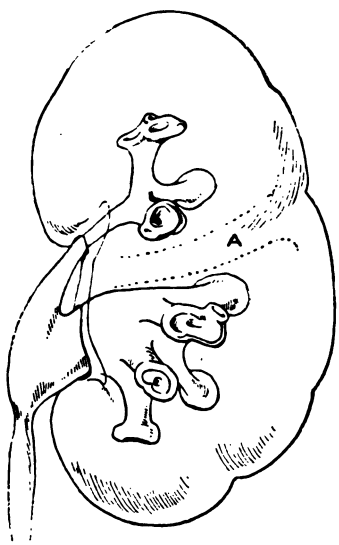
A Double Ureteric Orifice; Twin Ureters (both Patent).

Two ureteric orifices on one side will be rarely encountered; when this condition is met with it should at once engage serious attention, for the chances that the corresponding kidney will be found affected by inflammatory changes are great. A few words relative to the anatomy of this condition are perhaps necessary. From a surgical standpoint, says Max Brödel,* all forms of kidney pelves may be classified into—(1) true pelves, with major and minor calices; (2) divided pelves where there is no free communication possible between all the calices inside the kidney.

* Max Brödel, 'Johns Hopkins Hospital Bulletin,' No. 118, p. 10.

The kidney with the divided pelvis is not often met with. As a rule it preserves its fœtal lobulations, and has an abnormal arterial circulation; the division between the individual sections of the pelvis is generally marked on the surface by a deep groove (Fig. 8), thus causing the appearance as though there were two separate kidneys, one on top of the other. Frequently they are indeed separate organs, as far as their secretory function and their arterial circulation are concerned. The divisions of the divided

FIG. 8.

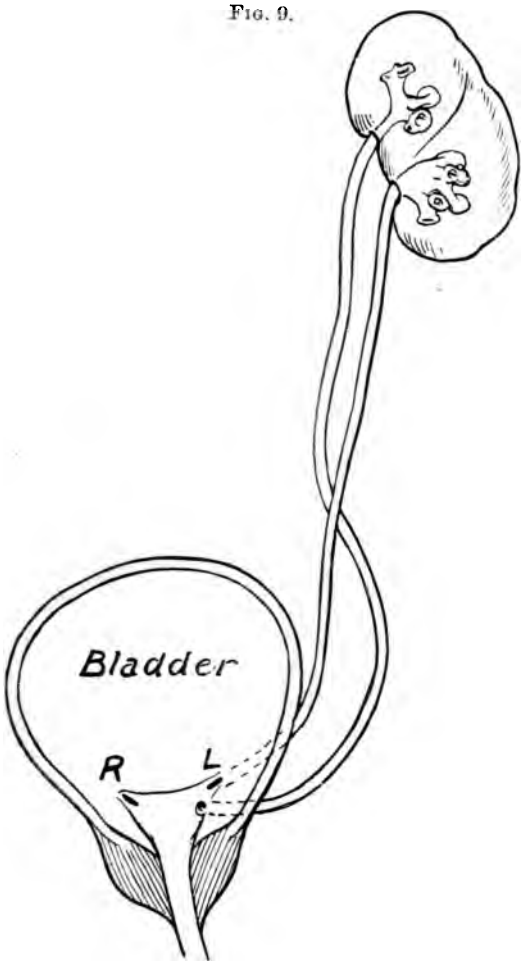


Left kidney with typical form of divided pelvis. The two divisions of the pelvis are separated by an area of cortical substance, A. (Max Brödel.)

pelvis generally unite into a common ureter (Fig. 8). In rare instances, however, the divided pelvis has corresponding ureters, and the double ureters enter the bladder near the usual site. But a careful examination of the scanty literature of double ureter will show that there is a rule for the position of the twin orifices, and this to the cystoscopist is of some importance.

Thus the ureter draining the upper and smaller part of the kidney opens lower in the trigone than the ureter

Fig. 9.



Author's case, to depict rule for position of the opening of double ureters.

draining the lower and larger section of the kidney (Fig. 9). The question is more fully dealt with on page 36, in which cystic termination of the lower ureter is discussed, but at present a case which occurred in my

practice is a good illustration of the anomaly and its recognition by means of the cystoscope.

Miss S—, æt. 27, was sent to me by Dr. Frank Corner. This patient had suffered for two years from a sharp knife-like pain in the left kidney, which passed along the ureter to the groin and inside of left thigh. It was increased at the catamenia; lately experienced most at night; worst, however, on movement. Some vesical irritability at night. There is a history of one attack of colic. There was no tubercle in the urine, and the X-ray photograph taken on three different occasions negatived the presence of stone.

On cystoscopy a double ureteric orifice was noticed on the left side; but one, the lower, was rounded, patulous, and the edge was eroded. The upper orifice was healthy. The patient's hips were elevated, and a catheter was laid in each ureter. A little clear urine was collected from the healthy orificed ureter, and only a little blood issued from the lower and diseased canal. It was, however, noted that the catheters entered and passed along both channels without a hitch and to the usual distance.

The left kidney was exposed in the loin. It was densely adherent, especially at the summit; a deep sulcus demarcated the upper third from the rest of the kidney. Both ureters were traced to the gland. Both seemed lissom and healthy; they were not dilated; one drained the upper third, and one entered the pelvis of the kidney about the usual position, being accompanied by the vessels. No stone could be discovered, and as the kidney tissue seemed firm the wound was drained. The patient was unrelieved. Probably the true surgery of the case lay in resection of the upper third.

Cases of double ureteric orifice found at the autopsy are recorded by Otto, Ramsay, Ewart, and others.

Twin Ureters—one Orifice closed—ending subtrigonally, "Blind, and of a Cystic Form."

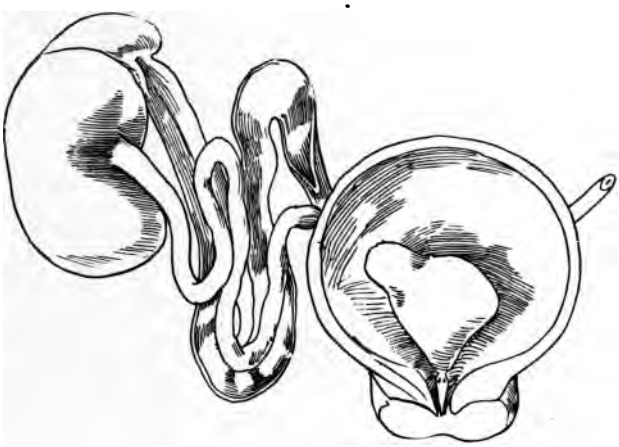
Another abnormality, as rare as it is difficult to diagnose cystoscopically, consists in the blind termination of a supernumerary ureter beneath the trigone—a condition which forms a link between double orificed ureters and one, perhaps as important and certainly more frequently met with, viz. that of cystic termination of a "pin-holed" orifice. Thus Lilienfeld* reports the autopsy of a man

* Lilienfeld, 'Beiträge zur Morphologie der Geschlechtsorgane,' Inaug.-Dissert., Marburg, 1856.

aged 65 who had died of typhoid fever, and who had suffered from retention of urine during the last few days of his life. Although Lilienfeld did not correctly interpret this case, yet the description permits of the case being classified as an instance of the blind termination of a supernumerary ureter (Grosglik).

No changes in the left kidney and the corresponding ureter. At the apex of the right kidney was found a formation resembling a supra-renal capsule in form and size. It was intimately connected with the kidney, and filled with brown fluid; its walls were covered on the inside by a thick layer of calcareous deposit.

FIG. 10.



Lilienfeld's case of cyst near orifice of double ureter. The divided kidney-pelvis, and double ureter are shown. One ureter ended at normal position, the other—the supernumerary—terminated in a blind cyst which projected from under the trigone.

At the inner and lower surface of this formation arose a blind tortuous canal which led towards the bladder, together with the ureter, issuing from the kidney (Fig. 10). The normal ureter then pierced the bladder wall in the usual situation, while the other canal did not communicate with the bladder, but opened into "another little bladder"; the latter lay in the region of the trigone, and partly overlapped, by means of a small outgrowth, the opening of the neighbouring ureter. The little bladder became gradually narrower downwards, and its apex reached the verumontanum.

Both "little bladder" and tortuous canal were filled with a brownish fluid. Both surfaces of the "little bladder" were covered by mucous membrane, between which a few muscular fibres were found in the connective tissue. The "little bladder" ended blindly and did not communicate with the urinary bladder.

Eppinger * describes the case of a man aged 22, in whom the lower segment of the ureter had pierced the bladder muscle in the usual situation, and ran beneath the mucous membrane in the direction of the ejaculatory duct, with which it communicated along the corresponding lobe of the prostate. The ureter for the whole length of this track formed a cyst with thin transparent wall, which was covered in front by mucous membrane, and was backed behind by the muscular coat of the bladder.

Ballooning of the Ureteric Orifice (so-called "Cyst" of the Lower Section of the Ureteric Tube).

Somewhat allied to the prolapse of the ureter in appearance, but differing from it in its causation and treatment, is the so-called cystic distension of the lower segment of the ureter—a condition which is dependent on the blind termination of that canal or on congenital narrowing of its orifice. Occasionally the lower orifice of the ureter is extremely minute, set in the side of a hard, fibroid, pea-sized mass, so small, indeed, that it only admits the point of a pin. If the urine from the corresponding kidney remains sterile, the force which is exerted by it is at first expended upon that section of the ureter which traverses the vesical muscle, and especially upon the thin and lax, mucous-membrane-covered orifice. This part gradually acquires the form of a bottle, the base of which is at the ureteric orifice. Gradually the mucous membrane is thrust into the bladder in the form of a globular cyst. The appearance varies according to the thinness of the wall. It may be obviously a cyst,

* Quoted by Bostroem, p. 43, *q. v.*

for it may have that glistening pearl-grey appearance so characteristic of fluid inside of a fibrous envelope, but usually it is of a reddened mucous membrane colour. It is distinguished from prolapse by its shape. A section of this cyst-like structure shows it to be lined inside by the mucous membrane of the ureter, whilst its external layer is composed of the lining of the bladder.

The condition, in fact, reminds one forcibly of the ballooning of the prepuce during urination in a boy who has congenital phimosis of a severe grade. I submit "ballooning" is the proper term to use for this abnormality, and that the designation of cyst is not only inappropriate, but misleading. One of the earliest and best illustrations of this abnormality is recorded by Sir Thomas Smith * in 1863, under the title of prolapse of the ureters into the bladder.

A man, apparently the subject of stricture, perinæal fistula, and pyuria, was operated upon by Sir James Paget, and died with symptoms of uræmia.

On opening the cavity of the bladder, which was much hypertrophied, one or two mucous sacculi were found protruding outwards between the muscular fibres. The vesical ends of both ureters were found to be prolapsed, forming pendulous pouches, into its cavity (Fig. 11). The openings of the ureters were reduced to mere pin-hole apertures situated on the most prominent part of each pouch (through these bristles have been passed in the specimen). The pouch formed by the left ureter was the larger; that formed by the right enclosed a stone about the size of a cobnut. The ureters were each about an inch in diameter, and their walls were greatly thickened; the kidneys were enormously dilated, being each about nine inches long; their secreting structure wasted, and their distended pelves containing purulent urine. The left kidney had within it two irregularly shaped calculi.

Dr. Burckhardt, of Basle,† has met with a similar double

* Cf. St. Bartholomew's Hospital Museum, No. 2367; 'Path. Trans., vol. xiv, 1863, p. 185.

† Burckhardt, 'Centralblatt für allgem. Pathologie und pathologische Anatomie,' Bd. viii, No. 4. A man æt. 62, who had died of pneumonia

protrusion of the lower ureteric segment, but with these two exceptions the literature only contains unilateral affections. I have on four occasions met with this condition on cystoscopy. In every instance there was no hesitation about the diagnosis; the globular protrusion in each case

FIG. 11.

Sir J. Paget's case of cysts of ureteric orifices, recorded by Sir Thomas Smith.

being obviously ureteric, also pale, white, and cyst-like in aspect. My first case was that of a lady aged forty-seven, brought to me by Dr. Bower, of Hendon.

and heart disease. Both ureteric orifices were narrowed and formed cystic swellings.

She suffered from grinding pains along both ureters (? colic), and extreme agony along the urethra after micturition, the act being frequent. There was much pus in the urine, but it varied in amount, as pyelitic pus usually does.

On cystoscopy I found the right ureteric orifice ballooned to the size of a large *white*-coloured walnut (Fig. 12). The left orifice

FIG. 12.

Author's case of ballooned right ureteric orifice.

was not enlarged. I first explored the left renal pelvis, finding it slightly dilated by a narrowing at its outlet. The ureter was healthy.

The right renal pelvis was then opened. It was markedly dilated, the pelvic wall was much thickened, and the upper ureter dilated. The middle section of the ureter did not seem enlarged; a bougie was passed along it to the bladder. No stone was present.

Finally the ballooned protrusion of the right ureteric orifice was cut off with cutting forceps introduced through the urethra, so as to allow free drainage to the right kidney. The lady recovered rapidly and completely. The empty sac-like protrusion looked *red* after it was removed, and could be slipped over the terminal phalanx of the thumb like a glove; the orifice was towards one side and pin-holed.

July, 1900.—Free from all symptoms and well.

July, 1901.—Free and well.

April, 1902.—Free and well.

This demonstrated to me that only one ureteric orifice may be affected; that stone in the kidney was not of necessity an accompaniment of the ballooning, and hence not the cause of the protrusion.

J. S—, æt. 51, was brought to me for difficult urination, sudden arrest of stream, and pelvic pain during the act. His history was as follows.

Sixteen years ago an attack of painless hæmaturia. Ten years ago another hæmaturial attack. Then gradual pain in right kidney. Recurrent attack of difficulty in micturition. Sudden stoppages in the stream; finally retentions, which have to be relieved by catheter. The right kidney was feelable and tender. No stone could be detected (X ray), but on cystoscopy a very remarkable condition was revealed. The bladder was finely trabeculated, but strikingly white and healthy, except in the right ureteric area. Springing from the area of the right ureteric orifice was a finger-shaped mass about one and a half inches long (Plate III). The cylinder was of a pale pink; it was covered with mucous membrane, on which could be traced marking of trabeculated muscle. I cut it off through a supra-pubic opening. No stone came down the ureter. He recovered promptly.

I saw my next case with my colleague, Mr. Harold Barnard.

A man æt. 33. He was suffering from occasional attacks of hæmaturia accompanied by pain at the end of micturition. The blood appeared at the conclusion of the act, and was due to "forcing out something." The pain was of a scalding character along the urethra and at the left external abdominal ring; the stream had occasionally stopped in the middle of the act. The left ureteric

Cystic distention (ballooning) of ureteric orifice simulating Eversion and prolapse of the lower ureter. (Author's case.) Combined cystoscopic view.

Bale and Danielsson, Ltd., London.

ice was protruding in a sac-like form (ballooned), about the size
monkey-nut. It was interesting to notice how erect and dis-
led and pale it became as it filled after each ureteric peristaltic
e, and how it slowly collapsed as the urine escaped into the
lder from the pin-point hole. The patient improved as the
itis subsided.
ix months later he pronounced himself "cured."

I was enabled by my colleague, Mr. Swinford Edwards,
examine a fourth, and a very typical case in a man
45. He had been suffering for seven years with a
ht lumbar pain, and latterly had irritable bladder and
ile pain. A stone could be felt *per rectum* high up in
right ureter. It came through into the bladder after
cystic bulging had been cut off through a supra-pubic
und.

Mr. P. J. Freyer reports a case* in which cystoscopy
evealed a smooth tumour, the size of a walnut, with
ck rounded pedicle, growing from the right side of the
e of the bladder."

Supra-pubic cystotomy was performed. The tumour,
size of a walnut, smooth on the surface except at the
x, where a small papilloma was growing from it, was
ached by a round tense pedicle to the bladder wall
r the right ureteric opening. On twisting off a
tion by forceps and then drawing the tumour into the
lominal wound it was found to be cystic, and contained
uric calculi, one the size and shape of a nutmeg, the
er the size of a large pea, the two weighing 42 grains.
e patient did well.

Another operation case is that of Dr. Grosglik,† con-
ned in an able lecture on the subject delivered before
Warsaw Medical Society, February 26th, 1901, and
m this communication I have obtained additional facts
ating to the subject.

"Obscure Cystic Tumour of the Bladder containing Two Calculi,"
ans.' Royal Medical and Chirurgical Society, Nov. 9th, 1897.
Grosglik, "Zur Kenntniss der angeborenen Harnleiter-Anomalien,"
per's Monatsberichte 'Urologie,' Heft 10, p. 577, 1901.

His case is as follows.

A man æt. 39 had sudden diffuse pain in the right hypochondrium, which became rapidly worse and gradually affected the right half of the abdomen. It was not typical of renal colic. It was increased by each act of micturition, which took place at regular intervals, three or four times in twenty-four hours. The attack subsided, and nine months later blood appeared in the urine, and then pus. The secretion had a sp. gr. 1010, and contained hyaline casts.

Dr. Grosglik diagnosed right-sided pyelitis.

On cystoscopy a rounded tumour with a smooth pinkish-red surface about the size of a walnut was seen to spring from the right ureteric area. The tumour showed marked transparency. The diagnosis of tumour of the bladder and pyelitis was made, and supra-pubic cystotomy was performed. The tumour was found to be a walnut-sized cyst, and on attempting to remove it, it tore open and a turbid fluid escaped. The finger was now introduced, and the cavity was recognised as a dilated ureter; two small stones the size of small beads were washed out. The patient recovered completely.

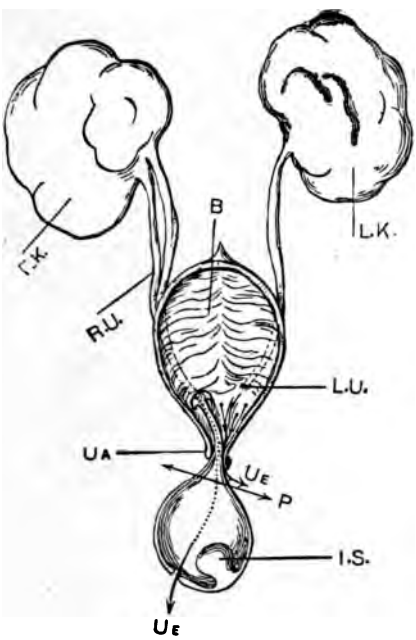
Caillé reports a case which he calls a "prolapse of the inverted lower portion of the right ureter," but his lucid description shows, I submit, that, in addition, a cystic distension or ballooning was also present, and that the case should be included not among the prolapses, but among the so-called cysts of the ureteric orifice.

A female baby aged two weeks who had had diarrhœa since birth was suddenly seized with a severe and prolonged fit of crying, and a soft bluish-red tumour, pyriform in shape, the size of a walnut, was then noticed to be protruding from the vulva. Palpation of the little mass gave the impression of a smoothly lined sac. A lateral opening in the right side was found, which admitted the passage of a probe. A small hard tumour the size of a pea within the cavity of the prolapsed sac was also noted, but its nature was not determined. It was assumed to be a prolapse of the whole or part of the bladder through the urethra, and after attempts at reduction its removal was determined on, and it was ligated and cut off. The baby died twelve hours later.

On *post-mortem* the removal of the stomach exposed to view a bluish, fluctuating mass about the size of a hen's egg representing the right kidney; also a mass similar in appearance, but smaller, representing the left. The right was in a state of suppurative

pyelo-nephritis. Both ureters were dilated. *The right ureter was double* (Fig. 13), with a double insertion into the hilus, both branches converging in their downward course and terminating by a single opening in the bladder. The bladder was found empty; the point of insertion of the amputated sac corresponded to the site

FIG. 13.



Caillé's case of cystic distension and prolapse of right ureter.
L.U. Opening of normal left ureter.
UE. Opening of inverted prolapsed right ureter.
P. Line of resection.

of the opening of the right ureter. The prolapsed sac, which had been removed by operation, was continuous with the mucous lining of the right ureter, and was in fact a prolapse of the inverted lower third of the right ureter into the bladder and through the urethra (Fig. 13).

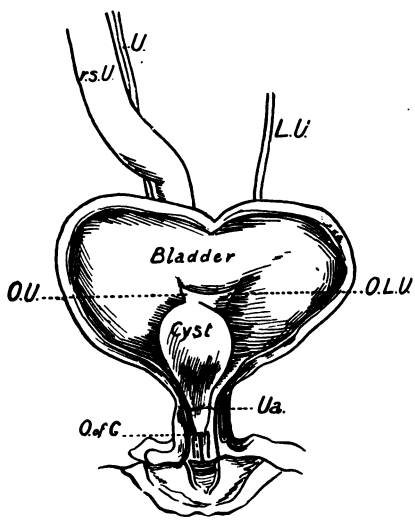
Dr. Caillé says, "It would appear that, owing to the formation of a warty or papillomatous small growth in the right ureter near its vesical insertion, a partial or complete occlusion of the ureter took place, in conse-

quence of which the small tumour was pressed into the bladder and finally through the urethra, carrying with it, or dragging along, the lower third of the ureter, which presented in the form of a sac." *

Pathological Anatomy.

From a very scanty literature of this obscure affection I select a few examples to illustrate its pathology more

FIG. 14.



Kolisko's case (modified).

r.s.U. Right supplementary ureter.
U. Right ureter.
O.U. Opening of right ureter.
L.U. Left ureter.
O.L.U. Orifice of left ureter.
Cyst at right side of trigone formed by the termination of the dilated supplementary ureter, *r.s.U.* The cyst opens at *O. of C.*

* 'International Journ. of Med. Sciences,' vol. xcv, p. 481, 1888. I always avoid criticising a case; but in this instance, without a microscopy of the small pea-sized tumour, I cannot accept the rendering that it was "papillomatous." In the cases I have seen a bluish-white, thickened fibrous nodule, or thickening, was present, which I submit is merely of an altered thickened ureteric orifice.

Blumer's case of ballooning of lower ureteric orifice.

exactly. Kolisko's* case refers to a woman aged twenty-one, who died of puerperal fever.

The right kidney had a double ureter and a separated pelvis. The upper pelvis, which corresponded to the upper, the smaller portion of the kidney, was much dilated, and the renal tissue atrophic. Its ureter, which was also dilated, pierced the bladder and terminated blindly below the position of the natural opening in a small nut-sized cyst (Fig. 14). The left kidney and ureter were normal.

Dr. George Blumer records a case, the particulars of which I quote from Kelly's invaluable work on operative gynæcology.†

A man who had suffered from acute cystitis for five years before death was examined post mortem. The bladder was enormously thickened (Pl. IV), was corrugated and covered with diphtheritic patches. On the right side there was a hydro-ureter and a cushiony protrusion into the bladder as big as the end of the thumb (Pl. IV, *b*). On the left side a pyramidal sac occupied the position of the ureteric orifice. The sac was fluctuating, eight centimetres long, three centimetres in diameter at the base, and nine centimetres in diameter near the extremity. High up on one side the minute ureteric orifice was found (Pl. IV, *a*), as big as a pin-point, and situated in the centre of a small area of dense fibrous tissue. On opening the thin-walled sac the finger could be carried directly up into the dilated ureter.

The last case I should like to quote is that of Bostroem's, and I am indebted to Dr. Grosglik's lecture for it.

It is that of a girl who was about six months old. Directly after birth a marked distension of the abdomen was discovered, and four months before death a trilobular tumour in the abdominal cavity was made out. The two upper lobes lay in the lumbar region, one on each side of the vertebral column, and reached downwards as far as the middle line of the third lobe, where they united with it, and the latter reached as far as the umbilicus. The lower lobe was barely moveable, and remained in connection with the urinary bladder.

From the scanty report of the course of illness, it appears that

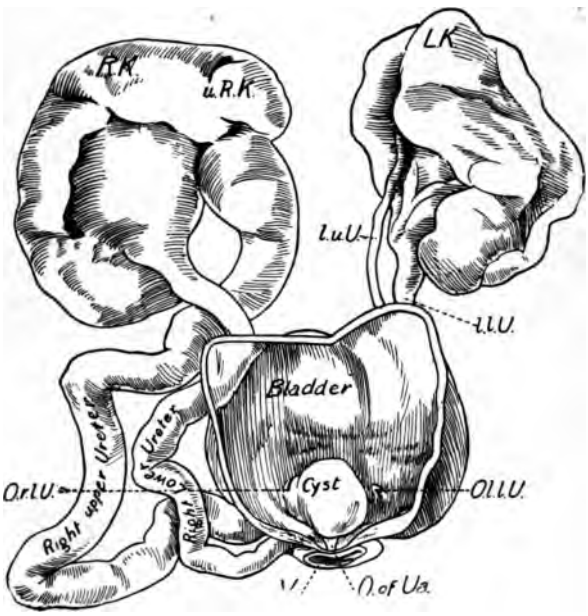
* 'Wiener klin. Wochenschr.,' 1889, No. 48.

† Kelly, 'Operative Gynæcology,' vol. i, p. 455.

the child at times remained dry for whole days, and only from time to time passed large quantities of apparently normal urine.

The post-mortem examination revealed numerous adhesions between the intestines and the three large tumours, of which the right one consisted of a hydronephrosis, of the size of two fists, and the left one of a hydronephrosis of half the size. The third tumour was the bladder enormously dilated, and filled with clear fluid.

FIG. 15.



Bostroem's case of cyst of ureteric orifice. [The arterial supply has been omitted.]

Cyst is at orifice of right upper ureter.
O.r.l.U. Orifice of right lower ureter.
O. of Ua. Orifice of urethra.
V. Vagina.

On each side were two pelves and two ureters. On the left side the upper ureter, corresponding to the smaller segment of the kidney, was less dilated than that of the lower larger segment. Correspondingly the upper pelvis was less dilated, and the kidney substance better preserved than below. Both ureters, which were closely adherent to one another, opened separately into the bladder (Fig. 15).

The right kidney also consisted of two segments, a larger lower one in the form of an extremely thin-walled cyst, and a smaller upper one, the secretory substance of which was nearly ten times as broad as the substance of all the other parts of the kidneys put together. Both ureters followed their course in a vermiform fashion, and were still more widely dilated than on the left side. The lower one opened at the normal situation in the trigone; the upper, more altered one pierced the bladder wall in a straighter direction, and ended blind as a walnut-sized cyst. The tension of the cyst varied, and depended on the degree of fulness; this could be modified by raising and depressing the kidney. In the condition of high tension this cyst appeared as a crescentic bladder, with very thin, smooth, transparent walls. It partly overlapped the opening of the neighbouring ureter, and as it extended to the left it compressed the openings of both the left ureters considerably, and caused a stasis of urine in them. The stasis was still further increased by the filled cyst completely overlapping the internal orifice of the urethra, whereby the retention during life was explained.

The bladder was much dilated and rugose. At the point of attachment of the cyst an opening in the wall was found. By means of this the cyst communicated directly with the dilated ureter. The tip of the little finger could be passed through the opening, which was surrounded by a ring of muscular fibres. The thin cyst wall was covered on both sides by mucous membrane.

A cursory glance at these and other cases in the literature reveals certain interesting and striking features, clinical as well as pathological.

In babies there is the history of fits, prolonged screaming, and diarrhœa with straining.

In the adult symptoms of cystitis, and if the ureteric protrusion was large enough to impinge upon the orifice of the bladder or to be caught by the sphincter, sudden stoppages in the stream, straining micturition, retentions, and even incontinence have resulted.

Pathologically, it will be noted how frequently a double ureter existed on the side on which the cystic termination was detected—nine cases out of fifteen in which the ending of the ureters is exactly specified.

It is noteworthy that the kidney from which a double ureter springs is often divided into two parts transversely.

An upper third, from whence the abnormally ending ureter emanates, this section of the kidney being atrophic from back pressure and diseased. A lower two thirds, from which the normal ureter arises about the middle, to end at the normal position in the trigone.

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CHAPTER IV.

THE VALUE OF URETERIC MEATOSCOPY IN THE LOCALISATION AND TREATMENT OF OBSCURE RENAL DISEASE.

HAVING learnt the A, B, C of ureteric meatoscopy, let us apply the knowledge by considering a few of the more obscure diseases of the kidney and ureter.

There was perhaps nothing so embarrassing to a conscientious clinician in pre-cystoscopic days as to be pressed to give a definite opinion upon the origin of blood or pus in the urine of a male patient who presented *no other symptoms* of disease. But the task is easy enough now, for the source of such blood or pus can be at once decided upon by the skilful use of the cystoscope. Again, before the introduction of that instrument, such cases, in their earlier stages, were beyond the domain of surgery. Surgical adventure was discountenanced because the difficulty of localising the disorder was insuperable. An insidious progress afforded the surgeon every inducement to temporise until the full development of the disease caused the diagnosis to become clear. But by then the chance was lost; a cure was unattainable. It is, therefore, to those diseases which produce blood or pus *painlessly* that one naturally turns to furnish the aptest illustrations of the value of the instrument.

Let us consider painless or symptomless hæmaturia first.

We know that blood may issue passively and painlessly from the bladder or kidney. Although it is difficult to group diseases with accuracy on the basis of single symptoms, yet my extended experience amply confirms the correctness of the table I published in 1893–5.*

* Author, 'Cardinal Symptoms of Urinary Diseases,' p. 21. 'Twentieth Century Medicine,' vol. i, p. 545.

Vesical	Onset sudden Course intermittent; rarely continuous Painless at first * Blood usually intimately mixed, but probably noticed pure at end of clear micturition at some time or other in course of case	1. Sessile or short-pedicled benign growth away from orifice of bladder. 2. Epitheliomatous tumour of posterior wall or sides (painless for months). 3. Aseptic vesical stone over æt. 55.

But there is no need to encumber this chapter with any further remarks concerning the vesical group, for I have dealt with this in detail in other works. It remains for the renal group to be considered, and in all cases it must be understood the hæmorrhage is *pronounced*, even profuse.

Symptomless *v.* Painless Renal Hæmaturia.

From the early days of the last century it was known that the kidney might bleed passively and painlessly, and professional opinion was much exercised about the causation. The literature on the subject is copious. Rayer † devotes a whole chapter to it, but it remained obscure until the cystoscope was introduced. Even now, although it is freely admitted that this form of bleeding is most often unilateral, and surgeons operate and examine the kidney carefully, its pathology and cause are still unsettled, and its nomenclature is ponderous, far-fetched, and ambiguous.

Thus, such cases are described by Senator, Pasnet, and Broca as renal hæmophilia; by Pigné and Reblaud and by Grosglik as hæmorrhage of anatomically unchanged kidneys; by Leguen as hæmaturic neuralgia; by Klemperer as hæmaturia from a healthy kidney; and by Rovsing ‡ as mysterious hæmorrhage. These authors

* The pain due to the passage of vesical clots is not, of course, taken into account, being merely temporary and of mechanical origin.

† Rayer, 'Traité des maladies des Reins,' 1841, Paris, t. iii, pp. 357—434.

‡ Thorkild Rovsing, "Mysterious Hæmorrhage from a Single Kidney," 'Brit. Med. Journ.,' 1898, pt. ii, p. 1547.

cannot explain the bleeding except by the supposition that a "local hæmophilia" or an "angioneurosis" existed in the organ. I cannot accept such terms either as applicable or as warrantable, for, as Rovsing has pointed out, a distinct pathological change is mentioned in most of the cases as being present. Thus in the case observed by Senator and Israel, histological examination of the removed kidney showed interstitial inflammatory areas; in Sabatier's case there was chronic albuminuria, bacteriuria, and the microscopy of the removed kidney showed traces of interstitial inflammation and sclerosis. In Broca's case epithelial and granular cylinders and cells of renal inflammation were present. Moreover, in Israel, Pigné, and Reblaud's cases the kidney was both displaced downwards and movable.

To me the subject has gradually assumed a simpler and a clearer aspect since I collated those cases of painless renal hæmaturia which I have examined cystoscopically during the last ten years. I do not, of course, ask for a general acceptance of the views I formulate, I give them merely for criticism and correction.

My painless renal hæmaturial cases fall primarily into five great groups. Each group, however, may, as its clinical history develops, be associated with renal pain, and to these latter I propose to devote a little attention later on, but their initial stages may be characterised by no other symptom beyond the appearance of blood in the urine.

1. Chronic granular nephritis (cirrhotic kidney).
2. Angioma or capillary nævus of a renal papilla.
3. Benign and malignant growths of the kidney (pelvis or ureter).
4. Rare cases of embedded aseptic calculus.
5. Submucous deposit of crude tubercle.

1. *The Painless Hæmaturia of True Granular Nephritis (Cirrhotic Kidney).*

History.—Since the middle of last century it has been

understood that hæmorrhage occurs in the course of chronic nephritis, but it was not, I believe, impressed upon the profession that the hæmaturia might occasionally be *quite severe*, until Sir George Johnson * wrote as follows:

"During the progress of the various forms of chronic Bright's disease the walls of the Malpighian capillaries become thickened, and therefore probably less liable to be ruptured. In many cases, too, the muscular walls of the minute arteries are more or less hypertrophied, and the effect of this is to lessen the pressure upon the Malpighian capillaries and the risk of their rupture. This appears to be the explanation of the undoubted fact, that the pale urine of low specific gravity which is secreted by kidneys in an advanced stage of degeneration is rarely tinged with blood.

"This rule is, however, not without exceptions. In the advanced stage of all forms of chronic Bright's disease the blood becomes much deteriorated, and the minute arteries and capillaries may undergo degenerative changes which increase their liability to rupture.

"There is consequently a tendency to hæmorrhage from various mucous surfaces, *e. g.* bladder and pelvis of kidneys. You will probably find there are no blood-casts of the tubes as there usually are when the substance of the kidney is the source of the bleeding. You may find some of those forms of tube casts which point to the existence of chronic rather than acute disease, *e. g.* oil casts, large granular and large hyaline casts."

Dr. Samuel West apparently recalled attention to this fact,† but considered the hæmorrhage to emanate from the bladder because of the *brightness* of the flow.

Unaware of this paper, I published in a series of lectures ‡ cases to prove that *bright* hæmaturia occurred in the course of chronic nephritis, that the hæmorrhage

* Sir George Johnson, 'Medical Lectures and Essays,' p. 747.

† Dr. Samuel West, 'Lancet,' 1885, vol. ii, p. 104.

‡ Author, 'Cardinal Symptoms,' 1893, p. 22.

most often issued from the kidney, and nearly always from *one* kidney. Further experience has convinced me that the hæmorrhage is usually from the mucous membrane of the renal pelvis, that the loss may be moderate and persistent, and occasionally alarmingly profuse. Also that when there is a great admixture of blood, the evidence of chronic nephritis in the shape of casts and other products of degeneration is not usually discovered.

Clinical.—The hæmaturia which appears during the course of the life history of chronic granular nephritis is, in my small experience, an early symptom. It has appeared in nearly all my cases before the advent of noticeable cardio-vascular or retinal changes. There are nearly always tube casts, I believe, to be found in the urine, even at the first attack of hæmaturia, also a faint trace or more of albumen, irrespective of the blood which may be present. The specific gravity ranges from 1010 to 1020. In most instances the bleeding has been transitory and moderate in character, darkish in colour, and under control of drugs, and the patient has not been sensibly affected by the loss. It may recur at intervals of months or years.

It occasionally happens, especially in anæmic girls, that the hæmaturia assumes a brighter aspect, and the more anæmic the patient, the more raspberry-red is the colour. It may then become constant, varying, it is true, in severity and in colour, but always present, and the loss may proceed for months despite all efforts to control it. Absolute rest, hæmostatics, astringents, opiates, all prove unavailing. As the anæmia deepens the patient becomes lethargic, breathless, and fat. Even now it may suddenly cease and not return, or return after months when other symptoms have supervened which give the clue to its causation, such as high tension, thickened arteries, accentuated cardiac impulse.

I have examined many such cases, and have had some under my observation for years—three, seven, ten years, —in fact, ever since the introduction of the cystoscope in

1889, and one or two remain apparently well and do not appear to be much incommoded by the occasional outburst.*

In rare instances the bleeding may be alarmingly profuse. I have met with patients, usually youngish men, in whom the hæmorrhage was so profuse that the bladder became filled with clotted blood, and all the pains of reno-vesical colic due to clot were superadded to the depressing effects of the hæmorrhage. Such cases are very perplexing, for the character of the vesical colic or subsequent cystitis import an obscurity into the history which seriously vitiates the accuracy of the diagnosis. One case came under my friend Dr. Tratman, of Perth, West Australia, and he found himself forced to do suprapubic cystotomy for the removal of the massy clots. The pain due to retention was at once relieved, and the hæmorrhage quietly subsided. In this case the symptoms were very sudden. When I saw the patient some months later the cystoscope proved the bladder to be perfectly healed and healthy in every part, but changes around the left ureteric orifice suggested to me that the bleeding had

* West mentions one case he had watched for eleven years, and though there is no notice about tube casts in the report, the urine was 1010, and albumen was usually present in varying proportions.

"*Recurrent Hæmaturia under observation eleven years.*—The patient was a man æt. 23. Hæmaturia was first observed in 1881 for ten days. Two attacks (ten days and seven days) followed in 1883; one in 1884; two in 1885; one in 1886; one in 1888. These attacks occurred under my observation. The blood was on all occasions bright in colour, and enough to colour the urine well. The urine was of 1010 sp. gr., and contained albumen (about one twelfth), but varied much on different occasions. The arteries were thick. There were no retinal changes observed. Frontal headache was the chief symptom.

"The patient was last seen in January, 1894, being then æt. 30. No new symptoms had developed and no retinal changes were present; no distinct cardiac hypertrophy could be made out, but the arteries were thick and tension high. The specimen of urine then brought contained no albumen.

"I formed the opinion in 1883 that the man probably had granular kidneys, and I saw no reason subsequently to change my opinion. I do not know the result of the case, which has not been seen since 1894."

been unilateral and left-sided. His urine was examined for me on several occasions by Dr. Leslie Eastes, and it always contained tube casts. Circumstances prevented me decapsulating the kidneys, and I lost sight of the case. Still further, the hæmorrhage may be as alarmingly profuse in patients suffering from chronic granular kidney complicated by urinary obstruction. Mr. Anthony Bowlby* drew attention to this subject in 1887. As there are usually other symptoms present, I allude to the subject under the heading of Hematuria with pain, on page 100.

Cystoscopy.

Ureteric Meatoscopy.—The cystoscope has demonstrated that the bleeding is from the kidney, and from one kidney usually. There is generally no visual change in the ureteric orifices, and unless there is an efflux of dark bloody urine from one of them the examination is valueless, beyond establishing visually that the bladder is free from disease and that it is not the source of the hæmorrhage. In rare instances I have seen the orifice puffy and the emergent and entering vessels more than usually visible. (*Vide* case of A. H—, p. 58.)

Ureteric Efflux.—When the kidney and ureter are functionating, a more or less forcible stream of darkish urine will be seen to issue and mix with the surrounding medium. I have seen (Ryan's case, p. 101) an oblique rush of dark bloody urine issue from an orifice, and when the efflux had died down and before another appeared I have noticed a little fresh blood ooze out, showing that the bleeding was from the mucous membrane and not from the parenchyma. This case was cured by free incision into the renal cortex. Sometimes the efflux is temporarily absent, the function of the kidney being inhibited by emotional impulses (cf. Case 1, p. 67).

Generally, however, it will be noticed that the jet is

* "Cases of Profuse Hæmaturia in connection with Granular Kidney," Clinical Trans.,' vol. xx, 1887, p. 147.

forcible, and the amount of the jet *large*. Often as not the opposite kidney and ureter will be working sluggishly, and the efflux on that side will be a feeble, glycerine-like stream. These signs are evidences that the bleeding kidney is working energetically, that the blood is but a small admixture, and that probably both hyper-secretion of urine and bleeding are due to local hyperæmia. Under these circumstances the other kidney works feebly, being probably reflexly inhibited, and it is remarkable that it may continue in this habit, even when the whole stress of the body work is thrown on it after nephrectomy of the bleeding kidney.

I have not yet encountered a case where both kidneys were bleeding simultaneously.

There is no need to quote many cases. I have had many. I once estimated they formed 12 per cent. of my painless hæmaturias. One or two recently noticed will be sufficient.

Case.—A. H—, æt. 27, consulted me in November, 1901, with well-marked renal hæmaturia.

A year ago he noticed his urine like strong beef tea. There were no symptoms; it subsided gradually. Four months ago the urine became bright red with blood. There was no pain, and the loss continued. He suffered, however, from "awful thirst," passed a quantity of urine, rising on an average five times at night, and lost two pounds' weight in a month.

When I saw him there were no marked cardio-vascular symptoms. There was no pain. The urine was copious, of the colour of strong beef tea, sp. gr. 1010, containing albumen, depositing red blood-discs in various stages of disintegration, including a brown granular deposit, the result of the completion of the process. There were numerous tube casts—blood, coarsely granular epithelial; several tubal cells were free in the deposit. There was no pus and no tubercle bacilli.

Cystoscopy.—I drew off twenty-four ounces of dark bloody urine of a renal type. The bladder was healthy, finely fasciculated. The right ureteric orifice was certainly swollen, and the vessels, emergent and entering, were very apparent in the form of a sheaf of four or five trunks passing along the interureteric fold. No efflux seen. The hæmorrhage ceased. The patient is still under observation.

I do not wish it to be inferred that the bleeding is invariably from the kidney in chronic Bright's disease. It may issue from the vesical neck, or the posterior wall of the bladder in very exceptional cases. It is then dependent, perhaps, on general vascular changes induced by the chronic nephritis, and seems to be similar to those other hæmorrhages from mucous membranes which are noticed in that disease. Usually it is much more arterial in aspect when it originates in the bladder.

Dr. Sears, of Blackheath, sent me a gentleman, æt. 60, with the following letter:

"The patient suddenly passed, on September 22nd, 1901, a quantity of pure blood from the urethra. The loss was repeated, being apparently causeless and painless. The blood ceased, and the urine was found to be acid, 1010, and to contain albumen. The deposit was considerable, and consisted mainly of red blood-discs in various stages of disintegration. A very few short casts filled with the granular débris of red discs were seen, and there was much renal pelvic epithelium, derived from the superficial and deep layers of the pelvic mucosa. There was no pus. A very few crystals of indefinite crystalline shape were present (L. Eastes)."

Dr. Sears considered his patient to have some chronic granular nephritic change, and his view was confirmed by the fact that the patient got up frequently at night and passed a large quantity of water.

I examined with the cystoscope September 27th. The bladder was white and healthy, a little fasciculated. Both ureteric orifices were healthy, but the uvula vesicæ was deeply congested; its surface was eroded, and looked as if it had been the site of recent hæmorrhage.

The prostate was small and fibrous. The patient did not improve; the hæmorrhages recurred, and became very profuse.

Fallacy in Microscopical Diagnosis.—It is perhaps necessary in these days of expert report upon urine treated by accurate centrifugalising to state that the casts must be in abundance.* If we are to diagnose chronic nephritis

* The presence of renal tube casts indicates a morbid lesion of the

upon this single symptom, it must not be because a few casts are present in the urine of a patient passing blood painlessly. A few casts are not diagnostic of chronic nephritis, nor are they any index of the extent to which the kidney or both kidneys have become affected by that disease. I know of *no* disease of the kidney in which casts may not be found in the centrifuge deposit. Thus ureteric bends, stone in the renal pelvis or ureter, carcinoma, slight pyelitis, may all supply a urine containing a few casts, for all these diseases more or less affect, either by pressure or inflammation, an increasing area of the renal parenchyma.

Occasionally a chronic nephritis may become affected by or be present with carcinoma of the kidney, and thus obscure the graver symptoms. A case was sent to me by Dr. Holroyd, of Chatham, with moderate hæmaturia, the urine being loaded with casts; the diagnosis of chronic nephritis seemed apt, and treatment for that disease was carried out. But in a year a large hard tumour appeared and filled the right renal region, and the urine became scarlet with blood—obviously a right renal carcinoma had developed, probably upon a kidney previously affected by nephritis. This diagnosis was confirmed by autopsy.

Prognosis.—Transient attacks of moderate dark hæmaturia occurring in conjunction with urinary casts or albumen (above that caused by the blood) need not be regarded with alarm, provided that the patient does not exhibit any advanced cardio-vascular changes and no retinal splashes are present.

kidney, but they convey no appreciation of how much the kidney is affected.

Mem.—Pure blood-casts indicate congestive hyperæmia; they are best seen in severe burns.

Blood-casts composed of blood-cells, epithelium, and leucocytes indicate acute nephritis; granular casts and fatty casts show chronic nephritis; epithelial casts and blood-casts, with much albumen in urine, show acute nephritis; pus casts and bacterial casts show septic influence of the renal parenchyma; amyloid casts show amyloid infiltrates.—NEWMAN, op. cit.

In fact, there is some reason to believe that such bleedings are generally from the pelvis of the kidney, and act like other moderate bleedings from mucous membranes, as a relief to the state of vascular tension. Moreover these renal hæmorrhages often occur early in the course of the disease, and clinical knowledge, as well as surgical intervention, points to the fact that small areas only of one or both kidneys are affected in the earlier stages, the disease spreading gradually. It affords thus a chance of appropriate treatment being early adopted for the disease itself, a fact which should make the prognosis more hopeful.

West * is very explicit on the greater hopefulness of the prognosis of chronic granular kidney. He says: "Granular kidney doubtless shortens life, but possibly not as much as at first sight appears. The disease is rarely diagnosed until it has reached its later stages and symptoms are pronounced; at that time it is true that the prognosis is bad, and that the patient, as a rule, has not long to live. As it is not until the late stages that marked symptoms arise, and as the pathological process is a long-standing gradual degeneration, it is evident that the real duration of the disease is much longer, and to be measured by years. Though it is true that the majority of fatal cases occur in the middle or later period of life, say between forty and fifty years of age, still there are good grounds for believing that the beginnings of the disease, even in these cases, are to be found in adolescence or early adult life, and that they may be recognised then with certainty in some cases and with much probability in many more. If, then, the disease, unrecognised and untreated as it usually is, permits of life to an average age of forty or fifty years, there is fair reason to presume that an early diagnosis and appropriate treatment would tend to lengthen its duration and thus improve the general prognosis."

Treatment.—I do not propose to touch upon the medi-

* West, 'Granular Kidney,' p. 146.

cal treatment of granular nephritis, but merely upon that which might serve to control the hæmorrhage. If there is no evidence of a recent acute attack of nephritis a mixture containing iron alum (gr. v) will often be found efficacious. In other instances opium in its various forms will often prove of value. The fluid extract of triticum repens appears to be the best of the infusions for passive renal hæmorrhage.

Operative.—One has been rarely called upon to operate for passive renal hæmaturia due to chronic granular nephritis, but occasionally the bleeding has been so obstinate and the patient's friends have become so alarmed at the increasing anæmia that surgical intervention has been demanded. Under these circumstances I have first cystoscoped and then cut upon the kidney whence the blood was seen to be issuing. I have invariably cut through the cortex of the lower half, believing that the hæmorrhage always issues from the lower calyces, and that fixation of the kidney is an important element in preventing a return of the hæmorrhage. This has sufficed to arrest the hæmorrhage.

The surgeon should not, I think, advise operation if retinal changes are present, for the duration of life after albuminuric retinitis has become apparent is short.* Nor would he be wise to do so if the cardio-vascular changes are well marked. No aseptic surgeon will, I take it, decline to operate merely because granular nephritis is

* Miley traced forty-five cases, and found the average duration of life to be under four months from the time when the eye changes were first observed; and though one of the patients lived eighteen months and two fourteen months, all the rest died within the year. In nine cases in which the first appearance of eye changes was noticed the duration averaged less than six months, and in two cases it took a month for white patches to develop after the appearance of hæmorrhages.

Bull, in 100 cases of albuminuric retinitis, found that 86 of 103 died, 57 in the first year, 12 during the second, and 17 after a longer period. Of the 17 remaining cases that were still living at the time his paper was published, 14 had been seen only during the six months immediately before the paper was written, but one had been diagnosed seven years previously (quoted from West).

present. So long as rigid asepticism and extreme gentleness of manipulation * are adhered to the patient will be benefited rather than the reverse.

Since the introduction by Edebohls of decapsulation of the kidney for the cure of chronic nephritis I have followed this method, but cannot speak positively yet as to its value in checking the hæmorrhage and curing the patient. His report has prompted me to advise operative interference earlier, and even in those cases where the hæmorrhage has not been severe.

Edebohls relates the following case,† which is extremely valuable as an indication of the value of surgical aid in hæmorrhages due to nephritis :

"*Acute Hæmorrhagic Nephritis; Decapsulation of both Kidneys at One Sitting.*—Married woman of 68. Severe attack of influenza in January, 1900, followed by albuminuria and cylindruria, with severe and persistent hæmaturia. Seen March 7th, 1900. Patient uræmic; urine black with blood. Right kidney three to four times its normal size, displaced, movable four inches, sensitive on pressure. Left kidney enlarged to twice its normal size, displaced, not sensitive. Examination of urine by Professor Brooks showed casts of all varieties in abundance, and a great deal of blood. Diagnosis of Professor Brooks: 'Renal hæmorrhage; tumour or stone.' Clinical diagnosis: tumour of right kidney.

"Operation, March 8th, 1900, under nitrous oxide and oxygen anæsthesia. Bilateral lumbar incision. Right kidney three times its normal size, purplish black from congestion, hardened, and infiltrated with numerous extravasations of blood everywhere. No evidence of stone or tumour on careful palpation of the delivered

* It is as well to remember that though aseptic surgery does not hesitate to interfere when albuminuria and casts are present, yet an attack upon an inflamed kidney demands *rigid* asepticity and the greatest gentleness of manipulation. Any inflamed kidney, and especially one which is acutely hyperæmic, is a most excellent culture material for pathogenic organisms; it is readily infected and as readily dies a functional death. It is, moreover, the most friable of all tissues; it tears easily and widely, bleeds alarmingly, and the hæmorrhage is sometimes so far beyond control that nephrectomy has to be performed. This statement is especially true for chronic parenchymatous nephritis.

† Edebohls, "Renal Decapsulation," 'Brit. Med. Journal,' p. 1510, Nov. 8th, 1902.

kidney. Left kidney twice the normal size, otherwise in same condition as right kidney, with the addition of the presence of three cysts, the largest being about 3 cm. in diameter. Nephritis acutissima of both organs. The largest cyst was cut away, and the two smaller were punctured. Decapsulation of both kidneys and anchorage by means of the detached capsule proper were next performed. The renal hæmorrhage ceased immediately and definitely after operation. Casts and albumen in the urine, with uræmia and occasional uræmic coma, persisted during the first two weeks after operation, and then finally disappeared. At the end of three weeks patient was considered well and left her bed. On March 29th (apparently the day of her getting up) she contracted pneumonia, the result of exposure to cold draughts. Œdema of the lungs supervened, to which she succumbed on April 4th, 1900 (*four weeks after the operation*).*

"Examination after death showed the left kidney restored to its normal size; right kidney only slightly enlarged; both kidneys healthy in appearance. Section through both kidneys failed to disclose any evidence of pus, stone, or tumour. Microscopical examination by Professor Brooks showed practically normal kidneys."

The reader will note that these results are obtained in four weeks; I do not comment upon the rarity of the case, the uncertainty of the exact cause of the nephritis, or rapidity of the change in the kidneys.

2. *The Painless Hæmaturia of Angioma or Capillary Nævus of a Renal Papilla.*

But occasionally the practitioner is confronted by a case of renal hæmorrhage in which no evidence of chronic nephritis is to hand, and no growth, tubercle bacilli, or crystals can be found in the urine. The diagnosis of such a case is, in my opinion, the most difficult of any in the whole range of urinary disease.

In some cases the papillary plexus of vessels which surround the papilla of one pyramid may become so dilated and numerous (angiomatous) that bleeding may occur and persist for years.

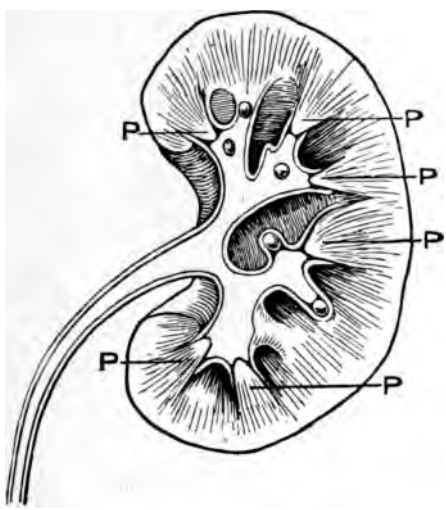
* The italics are mine.

I cannot attempt, of course, to formulate rules for diagnosis of this condition. I can only record briefly my own experience of it.

Before touching upon this important subject, which, I believe, may prove an important clue to the correct eludication of many of the obscure hæmorrhages from the kidney, I propose to glance at the anatomy of a pyramid.

On splitting open a kidney by a longitudinal section one notices that the solid part consists of a number (twelve to eighteen) of separate conical masses called pyramids of Malpighi (Fig. 16, P), which are embedded

FIG. 16.



Longitudinal section of the kidney to show pyramids (P) and papillæ projecting at various angles into the calices. (After Quain.)

entirely in cortical substance except at their apices (the papillæ); the broad bases of the pyramids are directed towards the surface of the organ, and the apices form the prominent papillæ which point towards and project into the sinus (the pelvis of the kidney).

The arterial branches penetrate the substance of the organ between the papillæ, and enter the cortical substance which intervenes between the pyramids of Malpighi; when they reach the base of the pyramid they form arches—arterial arches (Fig. 17). From these vascular arches straight vessels accompany the numerous

FIG. 17.

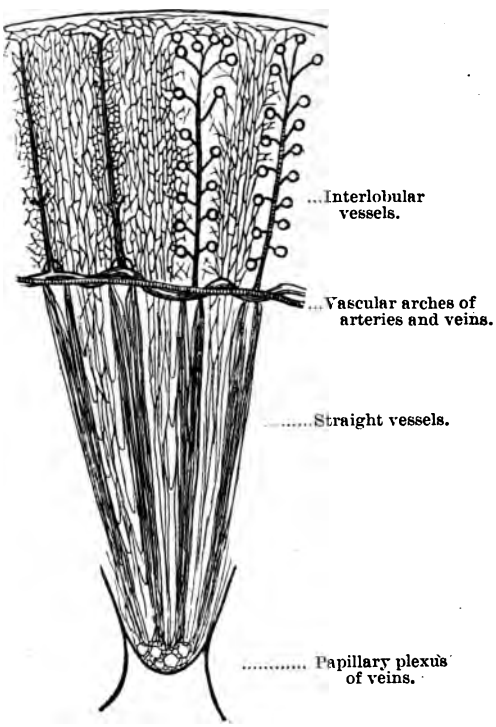


Diagram of a section through a pyramid and the superimposed cortex. (After Testut.)

tubes to the papilla. The veins of the pyramid commence in a close plexus of small venous radicles surrounding the excretory ducts at the papilla. They, passing outwards towards the base of the pyramid, collect in bundles and open into the concave side of the venous arch (Fig. 17).

Now in the cases I have encountered in which the angiomatous condition of the papilla was present, the persistent hæmaturia has been cured in two ways: either by cutting the varicosed papilla out bodily with a sharp spoon (papillectomy), or by cutting through the cortex and destroying the vascular arches of the base of the pyramid. In either case the bleeding stops at once—but it is very difficult to find out which papilla is angiomatous, for it may lie so deep in a calix as to be practically unapproachable from the pelvic cavity, as occurred in Case 6 (p. 72), in which case nephrectomy may be necessary. The subjects may be made clearer, I think, by giving cases.

Case 1. *Intermittent hæmaturia for five years, occasionally persistent, latterly profuse; märked anæmia; cystoscopy; renal exploration; renal pelvoscopy; papillectomy; cure.*—Miss L—, æt. 18, was sent to me in March, 1898, by Dr. Albert Davis, of Liverpool, to ascertain the site and cause of an intermittent hæmaturia of five years' standing. Dr. Davis wrote:

"The attacks come on suddenly when she is in good health, last several weeks or months, and cease as suddenly. She has been under the care of several, and has been in the Liverpool Royal Infirmary under Sir William Banks, who diagnosed the case as one of hysterical hæmaturia, because of the attacks ceasing as soon as she entered the hospital. Astringents have no effect. Bacteriologically and microscopically there is no evidence of the nature of the disease. I send her to you to examine the bladder with the light, and if that is normal to catheterise the ureters."

When the girl came under my care she was lethargic and profoundly anæmic. The urine was maroon-coloured; no casts, tubercle, or renal pelvic cells could be found by the Clinical Research Association.

I examined cystoscopically, and although on each occasion my catheter drew off dark bloody urine, I could see no ureteric efflux. I tried once or twice, but always failed, though bloody urine was passed soon after I left.

As she had a *suspicion* of rigidity and tenderness in the right loin, I sent her home with the diagnosis that both ureters were healthy, but that I believed the cause was stone in the right kidney, and in view of the extreme pallor and uncontrolled hæmorrhage right renal exploration, possibly nephrectomy, would have to be carried out.

But I was not satisfied; I remembered that on several occasions I had examined other cases for undoubted painless renal hæmorrhage and had found the ureters "off work." Could Sir William Banks be correct, and this dark renal hæmorrhage be really of nervous origin? The patient was brought back in a few weeks; her hæmaturia and pallor were more pronounced. One morning I appeared on the scene quite unexpectedly and examined her in bed. The left ureter was rapidly pumping jets of dark bloody urine; the right ureter was working slowly and sluggishly, but the urine from it was clear. Evidently by taking the girl unawares I had gained my object. The bleeding and renal secretion were under nervous control.

Instead, therefore, of cutting on to the right kidney as I had proposed, because of its tenderness, I brought the left kidney out on to the loin. It was healthy both to sight and touch. I therefore turned it over and examined its pelvis and ureter. Both were healthy. Hoping to find a simple solitary ulcer of the mucous membrane of the renal pelvis analogous to that condition which I had described in the bladder,* I incised the pelvis, separated the edges, and threw the electric light inside. After swabbing away a little blood I saw, to my astonishment, what I believed to be a villous tumour of a papilla. A tuft or congeries of vessels surrounded the extreme apex of a papilla about the middle of the sinus, just within the margin of the hilum (Plate V). My assistant and Mr. Woodhouse Braine, who was anæsthetising the patient, both examined the papilla. Every other papilla was pale and healthy. I now took a Volkmann's spoon and cut the papilla and fully half the Malpighian pyramid out. The wound leaked urine for a couple of weeks, and then firmly and finally closed. No blood was seen after the first dressing of the operation wound, and the urine at once became brilliantly clear. The tenderness in the right loin disappeared. She has remained well ever since, becoming stout and active.†

On examining this papilla under water I saw that it was not villous, as I had supposed, but that the vessels of the mucous membrane clothing the papilla were markedly varicosed.

Mr. Targett kindly examined the specimen for me, and reported there was no evidence of growth, but there was a congestion of the vessels with extravasation of blood and an increase in the cellular

* Author, "Solitary Ulcer of the Bladder," 'Brit. Med. Journal,' May 9th, 1896.

† Patient had a very slight relapse a few weeks ago, that is eighteen months after the operation, but is again well (December, 1902).

Angioma of a renal papilla which had bled for five years: papillectomy: cure.
(Author's case.)

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PLATE VI

Angioma of a lower renal papilla : papillectomy : cure.
(Author's case.)

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stroma. This might be—suggests Mr. Targett—an early stage of a fibromatous condition, such as is not uncommon in the tips of the papillæ.

Case 2. *Alarming hæmaturia; profound anæmia; cystoscopy; renal pelvoscopy; papillectomy.*—I was asked in September, 1899, by Dr. Wigg to examine a lady, æt. 30, suffering from profuse hæmaturia.

The hæmorrhage had appeared fourteen days previously without any apparent cause and without any symptom to mark the origin of the blood. No renal cells, growth fragments, tubercle, casts, nor crystals could be discovered (Clinical Research Association). Cystoscopy showed streams of bloody urine to be issuing from the left ureter; the bladder was healthy. Astringents were powerless, and the hæmorrhage became so violent and the patient so exhausted that I operated a week later, bringing the left kidney out on to the loin. It was absolutely healthy, likewise its pelvis and ureter. I opened the common pelvis and washed away the collected blood. The mucous membrane was healthy, but as fast as I washed away the dark blood more issued from the lower branch of the pelvis. I therefore slit it up through the kidney substance, separated the incision by means of retractors, swabbed out, and threw in the electric light (Plate VI). I now saw a bright red varicosed papilla, precisely similar in appearance to that which I encountered in my first case. Eight or ten medical men examined the papilla, and I was able to assert that this small point was the source of the hæmorrhage, and that by cutting it out the hæmorrhage would be arrested. The statement was received with much reserve, for it was hardly credible that so dangerous a hæmorrhage could originate from so small an area. I scooped out the papilla, and I am glad to say my prognosis was verified. No blood has appeared since, and the loin healed for a time. Mr. Targett reports that "the vessels in this part of the kidney are distended with blood, and there is some extravasation."

Progress of case.—The loin became inflamed some months afterwards. It broke open, and the sinus became septic, but no more hæmorrhage occurred. I am inclined to blame a couple of chromic acid stitches which I inserted into the kidney tissue at the time of the operation, because a colleague used a strand of the same material to close a renal incision, and it was subsequently passed *per urethram* after much suffering.

In these two cases the papillæ which were affected were got at easily. They were not deeply placed, but

just at the opening of the lower infundibulum. I was encouraged to continue opening the pelvis in similar cases, but I regret to say I did not appreciate the extraordinary obstinacy of the bleeding from a spongy, varicosed papilla, and my next case taught me that if it is operated upon at all, it has to be *thoroughly* removed.

Case 3. *Profuse hæmaturia recurrent upon the slightest exertion, persistent and profound anæmia; cystoscopy; renal pelvotomy; swabbing a papilla with strong iron solution proved useless; nephrectomy; cure.*—J. P—, æt. 36, was sent to me by Dr. Stewart, of Waterford. The patient had been admitted twice into Waterford Infirmary with profuse hæmaturia, and each time after a prolonged rest he had left the hospital with clear urine. The bleeding recurred, however, on each occasion in a week or two. He had had slight pain over the right kidney, which disappeared when the hæmorrhage ceased, and returned with its recurrence. When I saw him he was pallid and wasted. The hæmorrhage recurred on the slightest exertion. I suspected renal carcinoma, but could detect no tumour. Urine sp. gr. 1022—1030; no tubercle bacillus, pus, or blood; no casts. Large sharp efflux of dark urine from right ureteric orifice; bladder healthy.

Diagnosis.—Right renal hæmaturia; cause doubtful.

Operation (July 9th, 1902).—Exploration of kidney by the lumbar route. The right kidney was easily reached; it was fairly movable, and it had few adhesions; the cortex appeared normal. Its sinus, however, was distinctly hollowed (canoe kidney, foot-note, p. 16), and there was a separate blood-supply to the tail. The ureter was healthy. The pelvis was opened; blood kept issuing steadily from the lower infundibulum. Instead of performing papillectomy I applied iron solution to the bleeding patch, and hoped that would suffice. No benefit accrued. The bleeding continued unabated. He was therefore prepared for nephrectomy two months later (September 9th, 1902).

Cystoscopy.—The lips of the right ureteric orifice were a little puffy and stained red, the opening itself being patulous. A thin tricklet of blood issued from it when pressure was exerted on the right kidney and along the right ureter, but there was no jet. The left ureteric orifice was smaller, but it also was a little puffy and open.

Inference.—Hæmorrhage proceeds from the pelvis of the right kidney, which is either temporarily or permanently inactive. There is a slight inflammatory wave descending from the right kidney pelvis and affecting the trigone.

Operation.—The right kidney was found to have retracted under the ribs, as all inflamed kidneys do when no large collection of pus is present to force them down. I found the renal tissue very friable, and the bleeding became severe on manipulation. I removed it after clamping the pedicle. The patient healed, and reported himself well six months later.

The kidney was found to be in a state of subacute nephritis, probably induced by the operation. There was no pelvic growth, no stone, no ulceration, but the case is vitiated to some extent by the first operation, for it is uncertain how far the intervention produced the inflammatory condition found on the second operation; it is included, however, in the class containing angiomatous papillæ, because at the first operation, when the renal pelvis was inspected, a flow of blood issued from a lower calix. This case made me dissatisfied with opening the pelvis, and I determined to attack the vascular arches in the lower third of the kidney, for in the three previous cases the bleeding had originated from one of the *lower* papillæ.

Case 4. Pronounced hæmaturia for eight weeks; cystoscopy; section through vascular arches of lower third of kidney; cure.—I was asked by Dr. A. F. Penny to see a patient who had been passing blood in his urine for eight weeks without any intermission. There was no apparent cause for the onset, but after it had started any movement caused an immediate and a severe increase in the severity. It was quite symptomless. The urine contained blood-cells only, no casts, nor tubercle bacilli, nor crystals. Sp. gr. 1020.

Cystoscopy.—The bladder was healthy. An oblique rush of dark bloody urine was seen to issue from the left ureteric orifice; occasionally the efflux consisted only of a little brighter blood, which came out slowly and finished in a trickle; but generally the efflux was powerful, full, and dark.

Inference.—A healthy left kidney with a small area of hæmorrhagic disease, hyperactive because of irritation of the blood, and bleeding freely because of a congestion of the gland. The site of the bleeding point is pelvic because of the escape of tricklets of blood between the normally timed effluxes.

Operation.—I turned the left kidney on to the loin. If any kidney, or pelvis, or ureter appeared healthy, this did. I cut deeply into the cortex of the lower third, but *without entering the pelvis*, and roughly used the point of the finger to enlarge the bottom of the wound, hoping by this means to destroy the vascular arches of one or more of the lower pyramids. There was free bleeding, but this

was checked at once by cortical sutures. The hæmaturia disappeared in a few days, and he healed quickly.

Six months later patient reported himself as well.

Case 5. *Sudden brightish hæmaturia coming on in the night; intermittent, but returns on the slightest exertion; left renal incision; cure.*—G. Y—, æt. 38, was sent to me by Dr. Stanley Carpenter, April 29th, 1898. Ten days prior to seeing me an attack of symptomless hæmaturia, the secretion having the appearance of dark, muddy ale. Standing on the table, when he came to see me, was a sample left by the previous patient. *Both samples had exactly the same visual appearance.* One (G. Y—'s), however, was of renal origin; the previous patient had villous papilloma (subsequently removed by me).

G. Y— complained of no lumbar pain—no renal tenderness. There was no tumour to be felt. Urine 1025, acid; blood; no casts. After a long and fruitless trial with drugs, the bleeding being aggravated in severity by movement, I decided to interfere.

Cystoscopy.—Bladder normal. A rapid, dark, bloody efflux from the left ureteric orifice.

Inference.—A healthy kidney with a small hæmorrhagic area in pelvis.

Operation.—The left pelvis was felt as usual with the blunt end of the forefinger through a deep incision in the cortex of the lower third of the organ, but the pelvis was not opened; nothing was found.

The patient recovered quickly, though he had continuous hiccough for a week after the operation. The hæmaturia ceased at once, and he reported himself a year later as being in perfect health. He writes: "I have been working at my trade—piece-work at boiler and machinery work (and riveting). This is very hard work, and yet I have felt very well since my operation."

I should like now to add a sixth case, in which my attempt to control the hæmaturia by cleanly cutting through the vascular arches at the bases of the pyramids resulted in a failure; in other words, a precise, clean, deep wound in the cortex was valueless in checking hæmorrhage from a varicosed papilla. This case is so clear and complete that I give it somewhat in detail.

Case 6. *Two years' persistent hæmorrhage; cystoscopy; clean section of cortex of right kidney; no result; nephrectomy; cure;*

specimen showing one papilla in lower middle calyx spongy and angiomatous.—Mrs. O—, æt. 40, was brought to me by Dr. O. Leeson. For two years there had been dark blood in her urine without any intermission. It began after taking some "physical exercises," but this may have been a coincidence. There was no clue to the source of the hæmorrhage, except its dark colour, which pointed to a renal origin. There was no pain anywhere, no frequency of urination or difficulty in the act. There was a marked family history of phthisis. Many saw her and many diagnoses were received. One prominent physician felt convinced it was villous papilloma of the bladder, so an operating surgeon dilated the urethra and examined the bladder digitally, but failed either to detect villous growth or the origin of the bleeding. The bleeding never ceased. She became lethargic, anæmic, depressed, and hopeless.

I saw her in September, 1902. The bleeding was absolutely symptomless, and Dr. Eastes reported that the urine contained only blood-cells.

Cystoscopy.—The right ureteric orifice was a little swollen; pouring out of it were large effluxes of dark bloody urine.

Inference.—A hyperæmic kidney; area of hæmorrhagic disease small, because secreting power is great.

Diagnosis.—Either growth of pelvis or an angiomatous papilla in a lower calyx.

Operation (September 26th, 1902).—Right kidney loose, fatty tissue slightly attached to cortex. It was freely separated and brought on to the loin. It looked healthy in size, shape, and colour. Pelvis and ureter were perfect. The sinus was perhaps a little hollowed. No stone. As there was no evidence of growth I diagnosed an angiomatous papilla, and explained my reasons for the following procedure to Dr. Leeson, who was assisting me. An incision was cleanly made along the convexity of the cortex of the lower third, and deepened with the knife until I considered I had reached the vascular arches of the lower pyramids. The wound was then stitched up by interrupted catgut sutures.

I reckoned that this incision had, in all probability, cut through the vascular arches of the lower two or three pyramids, and that the resultant scarring would arrest the hæmaturia.

The hæmaturia was not relieved in any way. In fact, I think it was worse. I sent the patient to the sea-side, and she returned more anæmic than ever. I obtained leave to nephrectomise.

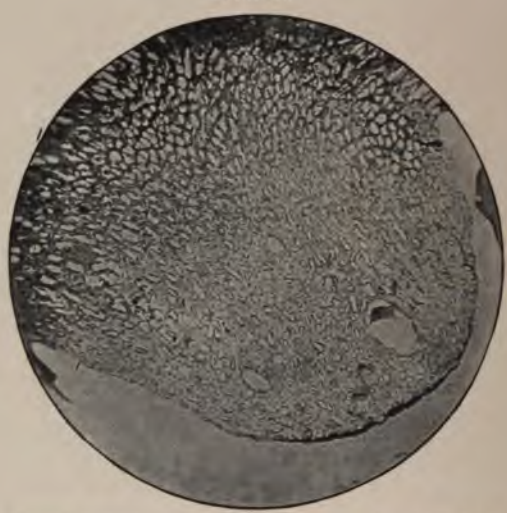
November 25th, 1902.—Two months after the first operation I cut on to the loin and removed the right kidney. The patient never passed any blood after this.

Dissection of the right kidney.—On cutting into the pelvis to see where the site of the bleeding was, I found it divided into two primary tubular divisions—both healthy (Plate VII).

In the lower, about the level of the commencement of the ureter, I noticed a small dark blood-clot in the mouth of a deep calyx.

On cutting up the track of this calyx, which proved to be short and truncated, a dark purple papilla appeared, and oozing from a bright point in its apex was a little blood. This was obviously the site of the persistent hæmorrhage of two years' duration: why had my incision into the cortex of September 29th not arrested the hæmorrhage? A scar ran almost to the base of the pyramid

FIG. 18.



Angioma of renal papilla. Case of Mrs. O—. Magnified 10 diameters.

affected, but it had not gone through the vascular arches. Obviously I had not been *rough* enough. It was at once painted (Plate VII), and then the papilla was cut out and sent to Mr. Targett for microscopy. He reports as follows:

"*Kidney specimen.*—A section of this specimen includes the greater part of the cortex of the kidney and the entire length of the enlarged papilla. The cortical tissues appear quite healthy, both as regards the glandular tubules and the glomeruli, but on passing up the papilla towards the pelvis of the kidney we find an extensive dilatation of the small vessels running in the papilla. Indeed, the

PLATE VII.

Angioma of a renal papilla, which bled continuously and freely for two years. Operation: cure.
(Author's case.)

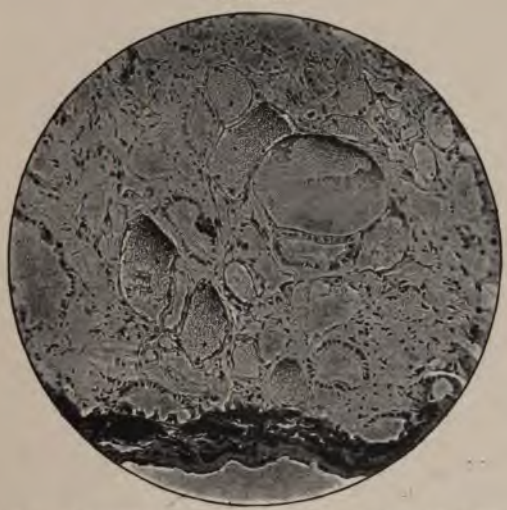
Del. and Chromo-Lith. by Bale & Danielsson, Ltd.

condition is so marked at the summit of the papilla that it constitutes a capillary nævus or angioma, and many of the longer vascular channels are distended with clot (Figs. 18, 19). In consequence of this growth of vessels the papilla is enlarged and the covering of transitional epithelium is greatly thinned (or actually wanting at the apex).

"The capillary vessels must therefore have been placed in direct communication with the cavity of the pelvis of the kidney."

With the experience of these six cases and another I feel I am justified in submitting that one cause, at least,

FIG. 19.



Angioma of renal papilla. Case of Mrs. O—. Magnified 80 diameters.

of a symptomless persistent renal hæmorrhage in the adult is traceable to a change in a papilla; that this change appears to the eye to be a spongy, varicose condition; that microscopy reveals its essential change to consist in a capillary nævus or an angioma; that either it has to be curetted out (papillectomy), or its blood-supply has to be thoroughly destroyed by rough tearing of that particular pyramid through a cortical incision. The particular difficulty of papillectomy is to find the papilla

affected, for it may be hidden deep in a long narrow calyx and escape detection. The pelvis has then been freely laid open to no purpose, for the bleeding continues (Case 3). The particular difficulty in breaking up the vascular supply of the diseased papilla from the cortex is the uncertainty as to where to find it.

Seeing, however, that the cases I have encountered have all been in the lower third of the organ, I should suggest the following:

In women where the kidney is readily displaced on to the loin the lower pelvis should be opened and inspected, and papillectomy be performed if possible.

That in men, with thicker muscles and shorter renal pedicles, an incision should be carried through the lower third of the cortex from the convex border, and the tissues torn down to the position of the pelvis by using the blunt end of the finger.

We read in the literature of such symptomless hæmaturias being cured by exploration of the pelvis with the finger through a cortical incision, that nothing could be discovered, and yet, to the manifest surprise of the surgeon, the patient was cured.

I have seen such cases terminate thus favourably in the hands of other surgeons who have asked me to cystoscope and indicate the origin of the hæmorrhage; but the exploration was always roughly carried out, and the bleeding at the operation was free.

There are three points in connection with this subject I wish to lay stress upon:

(*a*) *Causation.*—I am uncertain as to the nature of this change. It may be that the papillary change is merely a small area affected by chronic interstitial nephritis. It may be the drag or torsion of the vessels of the kidney (for in most of the cases the organ was somewhat movable). If the former, why are there no casts or other evidence of renal degeneration? If the latter, why is it painless? (cf. p. 112).

(*b*) I do not suggest that all cases need operation.

The bleeding sometimes ceases under ordinary astringent medicine, and though one cannot diagnose the condition except by actual sight, it may be suspected by the process of exclusion. Walter G—, a boy of fourteen, was sent to me in May, 1900, by Dr. Bone, of Luton, with symptomless hæmaturia of the brown type. The bladder was beautifully clear; the right ureteric orifice was large in relaxation and elongated. The bleeding was renal. There were no casts or tubercle bacilli in the urine. Nothing was done. This hæmorrhage continued on and off for eighteen months; it then suddenly ceased. His health improved rapidly, and he has developed into a tall (six-foot), healthy-looking, well-developed lad. (Dr. Bone, September, 1902.)

(c) Lastly, I do not wish to convey the impression that this papillary change exhausts the causes for symptomless renal hæmorrhage existing in patients in whom the urine contains no evidence of chronic nephritis; I merely impress upon the reader that apparently it is not an infrequent cause, and that this has to be taken into account by any surgeon who undertakes to check painless and persistent renal hæmorrhage by operation.

3. *The Painless Hæmaturia of Benign and Malignant Growth of the Kidney.*

It is unnecessary here to enter upon the pathology and differential diagnosis of benign or malignant growth of the kidney. The subject is indeed sufficient for a volume. It is enough to show, in those cases in which the kidney or its pelvis is thus affected "latently"—that is, in which there is no objective or subjective evidence of the presence of the disease,—that the cystoscope is of infinite value, for it often enables the surgeon to select and to remove the disease before any swelling of the organ can be detected by the hands.

To interfere, or to interfere only when a renal tumour has made its appearance, is to do so too late.

Benign and malignant growth of the kidney or ureter manifest their presence in the pelvis *early* in 37 per cent. of the cases by a painless recurrent hæmaturia, and in this respect they resemble the softer forms of benign and malignant growth of the bladder.* In such cases it is often impossible to feel any renal tumour.†

In my experience the earlier bouts of this hæmaturia are usually sharp, the colour being bright, and often accompanied by clots, which form in the bladder. But I do not wish to convey the impression that every attack is severe. The general character of the bleeding is brighter than that usually noticed in chronic nephritis. Often the initial hæmorrhage is traceable to a strain, over-exertion, or a slight blow, and the repetition of the bleeding or the degree of its severity seems to depend much on the same cause. Some patients with multiple hard deposits in the mucous membrane of the pelvis are troubled by a persistent loss of blood, but this is uncommon. The general type consists of recurrent attacks, with intervals of *clear* urine.

Now a profuse recurrent painless hæmaturia necessitates skilled cystoscopy.

The clinician will generally be well advised if he examines in the interval between the hæmorrhages—with the water clear,—when, in fact, the bladder need not be washed out for the inspection. If nothing is discovered the patient must be re-examined when the hæmorrhage is present, and in this case the bladder must be irrigated and each ureteric orifice inspected to detect a bloody efflux.

* Cf. Author, 'Tumours of the Bladder, Operative and Inoperative,' p. 79.

† Compare Author, "Surgical Affection of the Kidney," 'Encyclop. Medica,' vol. vi, p. 80. In tumours of the kidney in children hæmaturia takes place in about 25 per cent. of cases. These are always or almost always sarcomata. In adults about 20 per cent. of the cases of malignant disease present hæmaturia as a prominent symptom. These are divided between the sarcomata and carcinomata. In carcinomata alone 75 per cent. of the cases present hæmaturia as a prominent symptom. (Quoted from Dr. Newman's 'Renal Cases,' p. 137.)

Ureteric Meatoscopy in Benign or Malignant Growth of the Kidney.

(*a*) *In the Interval between the Hæmorrhages.*—I consider the change in the ureteric opening most frequently noticed in renal growth which has affected the pelvis, to be a dull-coloured swelling and elongation of the opening, a condition which is so noticeable in pelvic dilatation (*q. v.*, p. 22), the orifice resembling the swollen meatus of the male urethra. In other cases the lips of the ureteric orifice of the affected kidney may be normal in size, but the edges may be roughened and the interior may appear coloured a dull red, just as if it had been lightly smeared with dull red blood. Such a condition is frequently seen in *recent* profuse renal hæmorrhage—the hæmorrhage having ceased. This roughened and stained condition of the lips is not a constant feature; I have seen some of the severest renal hæmorrhages emerge from the healthiest looking orifices. The absence of this appearance, therefore, does not imply that there has been no recent hæmorrhage; it merely points to the absence of epithelial abrasion by large clots being extruded, or to slight surface microbic necrosis.

Should *well-marked* vessel twigs radiate from the very edge of one reddened ureteric orifice, the inference that the corresponding kidney has been the source of the recent renal hæmorrhage receives strong corroboration.

Still more certain is it if the lips and the corresponding part of the *plica ureterica* be slightly swollen and finely stippled with red (as in the early stage of acute urethritis), for in this case clots have passed along that ureter as well as fluid blood, and have, by their size or their decomposition, evoked a slight ureteritis. The last condition can be sometimes confirmed clinically by a report that the patient has suffered from slight or severe renal pain or renal colic, this symptom varying according to the size of the clot and the duration and difficulty of its transit along the ureter. In advanced cases, where

there is an enormous renal tumour, I have seen the corresponding ureteric orifice bloodless, and of a *dead white*, while the other ureteric orifice has been in every respect normal.

(*b*) *During an Attack of Hæmorrhage.*—But when renal hæmorrhage is present, an efflux of bright blood from one ureteric orifice is characteristic of severe bleeding into the corresponding renal pelvis. There is more bright blood than urine, the jet being correspondingly more solid than in the hæmaturia of chronic nephritis. Often a long cast, plug, or clot of blood will be seen projecting from the orifice, and obviously distending that part of the ureter which traverses the bladder wall. This distension is inferred by a distinct convexity of that surface which runs beyond the orifice, upwards and outwards, in prolongation of the *plica ureterica*. This convexity casts a deep shadow in front or behind, according to the position of the light.

It may happen while the cystoscopist is examining the plugged ureteric orifice that the clot is suddenly forced out, and a stream of blood follows the projected clot, and suddenly obscures the light of the lamp.

In all such severe hæmorrhages I am sure the kidney ought to be explored without delay, with permission to nephrectomise, especially if the bleeding be recurrent and the patient above the age of forty.

Clinical Illustrations.—The more interesting group is that in which the growth finds its origin in the mucous membrane of the pelvis, and especially when the growth is of a papillomatous character. I will give two or three illustrations.

Case 1. *Villous carcinoma of the pelvis of the right kidney; profuse and obstinate hæmaturia, painless; no clue to cause or source; cystoscopy; right ureteric efflux of blood; nephrectomy; recurrence.**—I was requested by a well-known London surgeon to cystoscope a gentleman, æt. 70, who had suffered from hæmaturia of a profuse type for two years. It was accompanied by oxalate of

* Quoted in an article, "Value of Cystoscopy in reducing the Mortality of Nephrectomy," 'Trans. Med. Soc. Lond.,' vol. xx, p. 228.

lime crystals in the urine, but no symptoms pointing to the source of the hæmorrhage had been noticed. He had had various opinions. Oxalate of limestone in one or other kidney, growth of kidney (Sir W. Roberts), and villous growth of the bladder ranked chief among the diagnoses. He had been cystoscoped and sounded and generally overhauled, but the case still remained obscure, and though he was willing to have both kidneys and bladder cut into if he could be freed from the debilitating hæmorrhage, there was a natural unwillingness on the part of each surgeon who was con-

FIG. 20.

Villous carcinoma of pelvis and dilated calyces of kidney; nephrectomy; healed. (Author's case.)

sulted to go on the quest of a hæmorrhage which might after all emanate from a prostatic vein.

On passing the cystoscope I saw the right ureter was emitting swirls of bloody urine, and I strongly advised the surgeon who had invited my co-operation to cut down on the right kidney and to explore it. This was done. The pelvis appeared free, no hardness could be felt at any point, but the sinus felt to me much atrophied from back pressure. The operating surgeon declined to open the kidney or the pelvis, and I could see that he doubted my

cystoscopic finding. He closed the wound, and of course my connection with the case ceased. I heard indirectly, however, that the hæmorrhage continued unabated, and though no hint of actual blame reached me, it was palpable that the failure of the operation was placed to the credit of an inaccurate or a careless cystoscopy. The patient again went the round of the profession in London and Edinburgh, and after two years I was again asked to see him, this time by his London medical practitioner. He was now wasted, bleached, and exhausted, but his courage and calmness were remarkable. He explained to me that with but slight and rare intermissions the hæmorrhage had not ceased for two years, and he mentioned the fact that pieces of villous growth had been discovered in his urine by an Edinburgh surgeon. As villous growth of the bladder is comparatively common and that of the kidney very rare (twenty cases in literature), I felt some uneasiness about my previous diagnosis of right renal hæmorrhage. I again cystoscoped. Again the instrument revealed hæmorrhage issuing from the right ureter, the orifice of which was much reddened and eroded. I therefore turned the patient over on to his side and removed the right kidney. Its pelvis was filled with villous growth, its cortex was honeycombed with cavities lined with the same growth (Fig. 20). The hæmorrhage at once ceased, and in a few weeks the patient was about. The specimen was examined by Mr. Targett, who reported as follows.

Report on kidney by Targett.—"The kidney is not enlarged. It has been laid open by a longitudinal incision from the convex border to the hilum. The cut surface shows considerable dilatation of the infundibula and calyces of the pelvis, so that the thickness of the glandular tissue is reduced to one eighth inch in many parts. The chief naked-eye features of the specimen on section are indicated roughly in the accompanying sketch" (Fig. 21).

Microscopy.—"Histologically the growth is exactly like one form of villous tumour which is met with in the bladder,—in fact, it is impossible to distinguish them. It is composed of coarse or 'fleshy' papillomata very closely packed together. These villi have rather delicate vascular cones, but are covered with a thick coating of transitional epithelium which gives them their fleshy nature. The neoplasm is evidently malignant, for the basis or subjacent renal tissue (much altered in structure) is becoming invaded by downgrowths from the intervillary sulci, in precisely the same way as the bladder becomes infiltrated by a villous growth. Moreover the thin-walled calyx at the lower end of the sketch has become perforated by the new growth, a tongue of which extends to the outside of the

cortex. It cannot, therefore, be regarded as a simple villous or fimbriated papilloma, still less as a fibro-papilloma. The term malignant papilloma or papillary epithelioma would convey a better idea of its morphology."

A year subsequently the patient returned to me with hæmaturia, and expressing himself as fearful that the left kidney had become

FIG. 21.

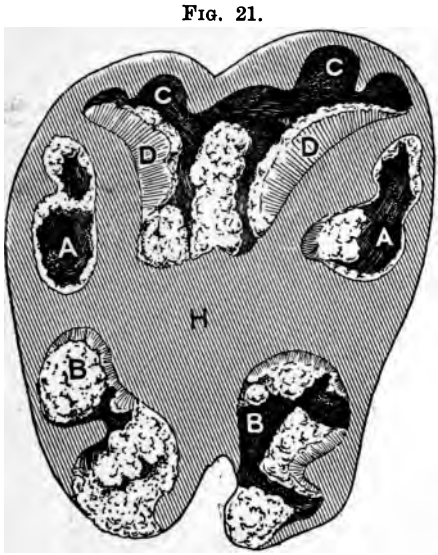


Diagram of longitudinal section of villous carcinomatous kidney in Case 1, p. 80.

A, A. Corresponding halves of a suppurating calyx, partially lined with growth or a thick pyogenic membrane.
B, B. A large division of the pelvis and its calyces almost filled with a warty growth.
C, C. Empty but dilated calyces.
D, D. Appearance of growth on section. It is markedly striated, and measures three eighths of an inch in thickness. The surface is like a cauliflower made up of closely packed coarse villous processes or papillomata.
H. The indurated fat in the hilum of the kidney. The reverse of the preparation shows that the hilum is practically filled with the cauliflower growth, which must have extended beyond it into the surrounding tissues.

attacked, or that the bladder had become similarly diseased. To my surprise, the cystoscope revealed blood coming again from the right ureter. Shortly before this Dr. Drew had shown at the Pathological Society a specimen of villous disease of the kidney, the corresponding ureter of which was studded with secondary

splashes of villous growth, implanted apparently by the urine stream from the original source.* It struck me at once that I had to deal with a ureter containing one or more villous tufts secondary to the original disease. I advised resection of the entire ureter. On exposing that tube I found that the upper end was globular and distended with villous carcinoma, but that the lower end below the pelvis brim was healthy. I resected the canal, therefore, down to the crossing of the iliac vessels. The character of the growth was similar to that found in the kidney. Fig. 22 represents the

FIG. 22.

Villous carcinoma of upper part of ureter, the lower part being free.

specimen. There was an uneventful recovery. The next phase was a large cocoanut-sized cyst containing blood, formed in the scar of the nephrectomy. This was excised. The wall was reported to be infiltrated by narrow branching processes of squamous-celled epithelioma.

I next detected a small growth of hard carcinoma of the prostate,

* Douglas Drew, "Villous Carcinoma of Pelvis of Kidney," 'Trans. Pathological Society,' 1897, p. 130.

evidently a secondary deposit. He died uræmic, five years after the nephrectomy.

Case 2. *Fig-sized villous papilloma springing from a lower calyx; profuse right renal hæmorrhage; nephrectomy; cure.*—In October, 1897, Dr. George A. Davies, of Newport, Monmouth, recommended a doctor to consult me. The patient, a strong well-built man of 30, accustomed to the rough life of a country practitioner, gave me the following history.

In September, 1896, he suddenly passed pure blood. There was

FIG. 23.

Villous papilloma of pelvis of kidney. (Author's case.)

no frequency of micturition; no pain. Next day he had acute right renal colic; he then passed a long ureteric clot. Every now and then there was a trace of blood in his urine.

July, 1897.—His bladder suddenly filled with blood, necessitating the catheter. He was then examined by a provincial surgeon with the cystoscope, and told he had an ulcer in his bladder (probably the cystoscopist was biassed by the fact that one sister of the patient had died of phthisis). When I saw the patient he was not

pulled down. He had a marked aortic diastolic murmur. There was much bright hæmorrhage in the urine. I cystoscoped him; both ureteric orifices were healthy, but the right efflux was bloody; the bladder was healthy. As he still had recurrent attacks of profuse hæmorrhage I explored the right kidney. The cortex appeared healthy, but the pelvis was distended with some soft material which proved to be growth. After nephrectomy a fig-sized and shaped papilloma was found springing from a lower calyx (Fig. 23).

Targett reports, February 11th, 1898, as follows:—This is a villous papillary growth from the pelvis of the kidney, and as far as the sections go I do not see any evidence of malignancy. It has a narrow attachment, and the intervillous spaces are well defined.

Patient writes saying he keeps well and active (August, 1902).

It has been suggested that villus-covered carcinoma of the mucous membrane of the renal pelvis is of slow growth and low malignancy. This is not always the case. We have no power of estimating the destructive or invasive capacity of any villus-covered growth springing from the mucous surface of the urinary tract. Some are slow in their invasion, and have a protracted lifetime; others are most rapid, and terminate the life of the patient quickly. Here is an example:

A clergyman, æt. 40, was sent to me by Dr. C. H. Hands, of Totland Bay. There had been hæmaturia in early life, and he had passed a calculus from the left kidney in 1899, pyelitis having been previously suffered from. The symptoms he complained of—pain in the left kidney, recurrent attacks of high temperature, pyuria, and hæmaturia—had been noticed for two and a half years only.

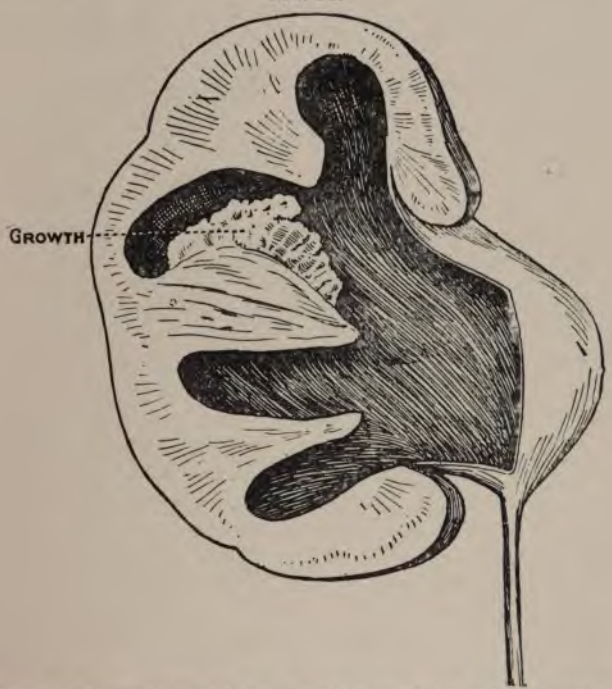
I removed a hollowed-out kidney, in the upper calyx of which was a patch of villous carcinoma the size of a half-crown (Fig. 24). I could not say if it was primary or secondary. Targett reported:

"The general characters of this growth are those of a papillary epithelioma resting upon a stratum of renal tissue and protruding into a cavity, such as the pelvis of a kidney. These papillary processes are so vascular that in places they may be called angiomatous; they are covered with stratified epithelium. At the base of the growth there is abundant evidence of malignancy, for branching downgrowths of epithelial cells have penetrated the renal tissue."

Now although this was a clean removal, and no apparent growth was left behind, yet in the course of six months he had obvious

recurrence in the loin, groin, and supra-clavicular glands, and he died at the end of the sixth month after the operation.

FIG. 24.



Inflamed hydronephrotic kidney, with a patch of villous carcinoma in an upper calyx; nephrectomy; generalisation in six months. (Author's case.)

Case 3. *Adenoma assuming malignant characters (?); five and a half years' hæmaturia from a small growth in the cortex of the right kidney; ureteric meatoscopy; nephrectomy; reported well six years later.*—Mrs. C—, æt. 48, was brought to me by Dr. Jekyll in February, 1895. The patient gave the following history:

1891.—Nursed husband with cancer of liver for six weeks. Three months after his death she passed dark bloody urine, quite symptomless.

On and off since that date she has noticed slight recurrence, until in 1893 a rather profuse dark hæmaturia supervened.

November, 1894.—Bladder symptoms (frequency, pain, scanty urine, difficulty), then profuse scarlet hæmorrhage necessitating catheter.

February, 1895.—A little frequency; a slight dragging ache over cæcum.

Cystoscopy.—Right ureteric orifice widely open, lips gelatinous; no efflux; left ureteric orifice healthy.

Diagnosis.—Carcinoma of right kidney. Advised operation, which was declined.

Lost sight of lady until October, 1895, when I received this letter from Dr. Jekyll:

"You may remember I sent Mrs. C— to see you about ten months ago, suffering from hæmorrhage from the bladder, which you believed to be due to commencing carcinoma of the right kidney. Since then she has been much better until lately, and now things are worse than ever. I cannot detect any lump in the side, and most of the symptoms have again pointed to bladder trouble."

Again interference was proposed, and again declined by patient.

Later on, June 11th, 1896, Dr. Jekyll again writes:

"During the last two months this lady has been much worse, with almost continuous hæmorrhage, so much so that I feel she is slowly dying. No enlargement of the right kidney can be detected. The slightest movement brings on alarming hæmorrhage."

The patient finally consented to operative interference. I cystoscoped December 18th, 1896. The bladder was full of dark blood and the urethra blocked with clot. Much washing out with a large litholapaxy cannula was necessary. Finally the medium was made clear, and then dense swirls of *pink* blood were seen pouring out of a much dilated right ureteric orifice. The urine had smelt recently; pus had been found in the urine, so that there was obviously a pyelitis in progress. There was no renal tumour to be felt.

The patient was turned over on to the left side and the right lumbar incision carried out.

Kidney densely adherent. Cortex covered by thickened indurated fat. A hard boss the size of a marble projected from the cortex of the anterior surface of the lower third. Ureter was the size and thickness of the vas deferens Kidney removed.

On laying the kidney open from cortex to pelvis, obvious back-pressure dilatation was seen, the papillæ being flattened, the calyces dilated, and the parenchyma greatly atrophied.

Projecting into the pelvis was a swelling which was somewhat like a bluish external anal pile in size, shape, and consistence. This proved to be the pelvic projection of the small boss which had been noticed on the cortex. On cutting through this little lump from the cortex to the pelvis the centre started out just like a spinal intra-articular fibro-cartilage—reddish in colour, tough in consistence, and apparently contained in a dense fibroid tissue envelope.

Targett reported on it as follows, December 18th, 1896 :—"There is a small oval deposit in the substance of the kidney. Its external surface is covered with a dense fibrous capsule, but internally it protrudes into the pelvis of the ureter, having ruptured the mucous coat of that structure. On section it has a spongy appearance, some of the cysts being one sixteenth of an inch across, and many are recognisable with the naked eye. Microscopically the sections from the periphery show dilated and disorderly tubules like the convoluted tubules, and at first sight it does not look malignant; but deeper down there are many solid masses of epithelioma and narrow processes running into the fibrous stroma. Add to this the fact that it is protruding into the pelvis, and the evidence of malignancy is very strong. One cannot help speculating that perhaps this was originally an adenoma of the tubular type, and that it has assumed malignant characters of late. The nodulated condition of the inner surface of the pelvis and calyces is entirely due to chronic inflammation. In the face of so much evidence of inflammation I was at first inclined to regard the deposit as altered renal tissue, but I think now that the evidence of malignant carcinoma is definite. Some of these renal growths are very difficult to unravel."

Last letter received from this lady in New South Wales, dated July, 1903 :—"I am in excellent health. When you once told me I had commenced a fresh lease of life I had my doubts, but I have often thought since how correct was the surmise."

Case 4. *Papilliferous carcinoma of middle third of unenlarged kidney; profuse hæmaturia nine months; ureteric meatoscopy; nephrectomy.*—Dr. Boissier, of Banbury, brought me on October 10th, 1896, a gentleman æt. 59, with hæmaturia. Symptomless, intermittent, and profuse hæmaturia had been present for nine months, and it was expressly stated that there had been some *left* renal colic. No renal swelling could be made out.

I cystoscoped October 20th, 1896, having obtained permission to do what was thought advisable after the examination. The bladder was free, but a jet of arterial blood was seen issuing from the opening of the *right* ureter, then a clot was forced out of the orifice as if from a mould, and its exit was succeeded by another jet of blood. The lip of this orifice was stained with blood. The left ureteric opening was healthy. Dr. Boissier, who was present, was certain that the renal colic was left-sided, and yet the hæmorrhage was from the right. I had such confidence in the cystoscope being correct that I removed the right kidney at once, although it did not feel enlarged. A carcinomatous growth occupied the middle of the

gland (Fig. 25), and on questioning the patient subsequently we found that he had misled us as to the side in which the colic pain had really been felt. The patient remained well for long, but died of cancer of the liver six years later.

FIG. 25.

Papilliferous carcinoma of middle third of unenlarged kidney.

Targett reported thus :—" The kidney shows a rounded tumour in the cortex which projects into the hilum on the one hand, and upon the convex border in the opposite direction. It is quite covered with a capsule externally. Microscopically it shows alveoli or spaces of various sizes, and these are filled with delicate branched papillomata. Each papilloma has a central capillary bearing a single layer of short columnar epithelium. Of course this structure cannot be made out everywhere. In some there are sections of tubes which might be intervillous spaces. However, the type is undoubtedly papilliferous, and resembles one form of malignant growth in the

Lower 4/5th of left kidney transformed into adrenal "rest."
Carcinoma: nephrectomy: healing.
(Author's case.)

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thyroid body. I presume the disease begins in the convoluted tubules, which become dilated and then filled with intra-cystic papilloma. It is obviously malignant."

Case 5. Very large adrenal rest carcinoma of the left kidney; intermittent painless hæmaturia for three and a half years; nephrectomy.—I was asked in September, 1902, by Dr. Charles Ewart, of South Kensington, to see a gentleman, æt. 57, who was bleeding profusely with the urine, but who had no symptoms which pointed to the origin of the hæmorrhage.

In April, 1899—three and a half years before I saw him,—the patient had a sudden attack of hæmaturia (darkish). This recurred and became intermittent and severe. It was quite symptomless. Finally he had clot retention, and severe bladder pain and distress whilst abroad. On his arrival home he was still bleeding, but was able to empty his bladder.

Cystoscopy.—No efflux from the left ureteric orifice, only a trickle of blood. Right ureteric orifice healthy. Bladder stained with blood here and there, but healthy.

Inference.—Hæmorrhage from the pelvis of a resting or inactive left kidney.

I now did what I should have done at first—examined the kidney, and immediately felt a resistance in the left flank and loin.

Operation.—I removed, with much difficulty, a large, hard, very adherent kidney from the left side; it was 5½ inches long, 4½ inches broad, and it weighed a pound. On cutting it longitudinally it had the typical appearance of an adrenal "rest" carcinoma, a diagnosis confirmed microscopically by Targett (Plate VIII).

The patient did well, and I see him occasionally, but twelve months have not yet elapsed since the operation.

The record of clinical work is not worth much if failures and difficulties are not included. There must always be such. Uniform success is neither profitable nor conducive to progress. I append, then, two cases which I have had, the first demonstrating failure; whether in accuracy of diagnosing the side from which the hæmorrhage came, or in the renal exploration, I cannot say; and the other a difficulty which I do not see can be overcome.

A failure in diagnosis.—W. S—, æt. 61, a patient of Dr. Frank Little, of Teignmouth, was admitted with a history of intermittent painless hæmaturia in April, 1900. This had first appeared in 1887 after a severe chill. Twelve years later, May, 1899, another attack

occurred in which he passed blood painlessly three times. The secretion was rather dark; there were no clots.

In December, 1899, another attack supervened, and since then up to date of admission the patient has had dark, painless hæmaturia with occasional clots every three weeks. He has been losing flesh. There is some increased frequency, $\frac{2 \text{ hrs. D.}}{3 \text{ hrs. N.}}$

Cystoscopy.—Healthy bladder, somewhat fasciculated; left ureteric orifice larger than right, and a stream of red blood issuing from it.

Inference.—Left renal pelvis bleeding; kidney mainly healthy.

Operation.—Left lumbar incision. A healthy, firm kidney, with a small healthy ureter. I opened pelvis and examined it with the eye and finger; found nothing abnormal; replaced gland.

He died a year later, the hæmorrhage having continued at intervals; he became very emaciated and cachectic, and his medical attendant, Dr. Little, kindly sent me notes of the autopsy which he made. Left kidney—the one examined by the eye and finger,—weight 5¾ oz. "Considerable disintegration of medullary part; signs of hæmorrhage; a small stone was found in a calyx high up in the pelvis." Right kidney twice the size of left, 11½ oz.; malignant growth infiltrating cortex.

I do not attempt to explain this case. I cannot say if the stone found in the left kidney had been the cause of the hæmorrhage, or whether the left ureter was mistaken for the right and the bleeding emanated from the carcinoma. It is, I believe, my only mistake in ureteric meatoscopy of blood effluxes. It carries these lessons:—Be sure of the side to which the bleeding ureter belongs; be thorough in exploring for stone if the pelvis is opened.

A difficulty in diagnosis.—D. R—, æt. 41. This patient was brought into the operating theatre at the London Hospital with profuse hæmaturia, so profuse that the case was deemed urgent enough for immediate attention. The bleeding had only been noticed a couple of days, but it was most alarming. There was no pain, and none had been complained of. No previous history of any illness or any symptoms was obtainable.

The bladder was distended with blood-clot and bloody urine. After much washing and suction of clot the viscus was finally rendered clear, and the following condition was seen:

Projecting from the right ureteric orifice was a buff-coloured clot.

The line of the ureter as it passes through the vesical wall was very protuberant, as if a hard clot was filling that section of the channel. To the right of the ureteric orifice was a small papilloma the size of three grape pips. This was obviously due to ureteric irritation, and not the cause or origin of the bleeding.

I therefore diagnosed carcinoma of the right kidney and proceeded to remove it. The gland was big; the true capsule was densely adherent to the perinephritic fat and as densely adherent to the gland. I cut into the pelvis and evacuated a large quantity of *old* decolourised blood-clot and pale beef-tea coloured urine, and the big kidney collapsed to a very small hollowed-out gland. I removed it. The pelvis was thick like an old hydrocele; the mucous membrane was of a dark maroon colour and furred with adherent recent blood. The hollowed-out recesses of the atrophic kidney had a similar appearance.

Now, as recent blood was removed from the bladder and old blood was found in the kidney, it was obvious that the ureter had been the source of the hæmorrhage and not the kidney, but the patient was too collapsed for further intervention, so that he was sent back to the ward.

The hæmaturia continued in a diminished form for some days, showing this surmise to be correct, then it gradually subsided; but it recurred in a few months, and was accompanied by a nauseating pain in the left lumbar region.

A year later this patient came again to see me. His right leg was enormously swollen and œdematous. I explored the stump of the right ureter in the hopes of detecting an impacted stone, but instead of this I found the tube thickened in its entire course to the size of two fingers. It was not only densely hard, but all along its surface were small, hard, shotty bodies. It reminded me of primary ureteric carcinoma* or of psorospermia of the ureter.† He died a few months later, and I had no opportunity of a post-mortem.

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* Author, 'Tumours of the Bladder,' fasc. i, chap. i, p. 12, "Malignant Growth of Ureter."

† *Psorospermial cysts of the urinary tract*, a case of which was sent me by Dr. J. Arnold Jones, of Aberavon, and exhibited at the Pathological Society by Mr. Eve. The cysts were miliary in character and full of colloid material. The specimen was removed from a woman æt. 51, who died after seventeen days' profuse hæmaturia ('Brit. Med. Journ.,' p. 1173, May 25th, 1889).

(4) *Symptomless Hæmaturia in Rare Cases of Embedded Renal Calculus in the Adult.*

I have noticed that it is customary among consultants to suspect and even diagnose latent calculus of the kidney in cases of symptomless renal hæmaturia in the adult.

This may be, and often is, a correct diagnosis in the child, but, as a matter of fact, stone in the kidney *of an adult* very rarely produces blood without pain being experienced at some time or other in the course of the case; symptomless hæmaturia, as an onset symptom, marked the presence of a renal stone in only 3 per cent. of my cases. In nearly every instance definite and characteristic renal pain has preceded the blood, or has followed it so rapidly that a correct clue as to site and cause of the bleeding was obtained.

It may be asked, how has the impression arisen that symptomless renal hæmaturia may betoken stone? It is, I venture to believe, a common error to diagnose and treat a case by the *recent* history of its symptoms and progress. No question is put to the patient as to pain in early life. Now a kidney stone once fixed by the support of growing branches or otherwise embedded may cease to pain. It may lie latent or symptomless for years, and the fact that there has been a kidney pain may be altogether forgotten by the patient. But if, when the stone has become fixed, slight erosion takes place in the mucous membrane of the renal pelvis from pressure, blood may appear in the urine without pain or any other indication of renal stone. Such cases are sufficiently common to impress the literature or professional experience with the belief that a latent renal stone may cause symptomless hæmaturia. I repeat, this view is wrong; there is nearly always an old history of renal pain in symptomless renal hæmaturia due to stone. Here is a case in point. I will first give the history as taken out by the house surgeon, and then as checked by myself.

Miss E— (vol. xviii, p. 68), æt. 36, sent me by Dr. Oldfield.

House Surgeon's report.—One year and a half ago this patient noticed that she was passing bright red blood in her urine. It followed upon a severe "cold." There was no pain either in the loin or on micturition. The blood soon ceased, but recurred on walking or on the slightest exertion. There was an occasional bout of irritable bladder, but usually the patient retained the urine for four hours easily.

Diagnosis.—Symptomless hæmaturia.

My own history notes are as follows:—"The urine is alkaline, the deposit copious, and consists chiefly of huge crystals of triple phosphates and small aggregates of the same. There are also numerous crystals of stellar phosphates, some amorphous phosphates, and ammonium urate. With this there is some muco-pus and blood. No casts or renal cells; no tubercle bacilli."

On questioning the patient, I elicit the fact that when a girl she had had severe pain in the left kidney for ten years, that it gradually subsided and never returned. Diagnosis: phosphatic-covered stone in left kidney.

Operation.—I removed a large dendritic stone from the left kidney. The greater part of it was composed of lime phosphates, but one piece (? the nucleus) was oxalate of lime. Probably the oxalate had irritated the mucous membrane, causing pain for ten years. As phosphatic material became deposited upon it, it gradually grew, and was moulded by the calyces until the stone became fixed by its branches; the pain then ceased. An attack of epidemic influenza or a severe cold determined a congestion of the mucous membrane, and an erosion of the surface ensued, which could not heal in the alkaline tide of urine. Blood appeared in the urine, but was symptomless because the stone was fixed.

But to return, in rare instances stone in the kidney does produce a symptomless hæmaturia. Here is a case in point:

Case 1.—Mrs. J—, æt. 30. This patient was sent to me by Dr. Keser, in 1897, for examination. She had excruciating bladder pain, and her urine contained blood and pus. Her bladder had been washed out twice daily for two months without relief.

History.—Her father had died of phthisis. There was a family history of hæmophilia. She herself bled furiously on any slight cause, such as confinement, menstruation, extraction of teeth.

Two months ago she was seized with hæmaturia; she had a good

deal of irritation of the bladder, passing her urine every hour in the day and twenty times at night. She suffered much burning pain supra-pubically, so much so that she could scarcely bear her nightdress to touch her stomach, and marital intercourse was so exquisitely painful that she lived apart. The bleeding was constant, it never ceased. There was no renal subjective symptom of any kind.

The urine was usually 1012. It was loaded with albumen; it was acid; pus and blood were present. No tubercle bacilli could be detected. The case read very much like vesical tuberculosis, but on cystoscopy I was astonished to see brightish red mud shoot out in thick puffs from the right ureteric orifice with hardly any intermission. As fast as I washed out the bladder the medium grew murky. I have never seen such streams of bloody pyuria. I cut on to the right kidney and found an oxalate of lime stone the size of a small bean, buried in the mucous membrane of the pelvis near the orifice of the ureter. The pelvic cavity was dilated and inflamed. The patient did well for a year, but finally I had to remove the kidney, after which she remained well and continues to report herself (January, 1903).

I may add, in my first hundred cases of renal calculi I have only had two other patients, in both of which it was distinctly noted that symptomless hæmaturia was the onset and only symptom, and remained the only symptom for a month or two, after which the characteristic pain of renal stone appeared.

Case 2.—A. R—, æt. 26, sent me by Surgeon-Captain Perry. Five years ago blood passed. He had to inspect boilers (very hot work), and noticed that after coming out of the boilers he passed black water. No pain for *two* months, then pain in the right kidney. Since then characteristic symptoms of calculus. I removed a small fixed oxalate of lime calculus, with a crystalline surface, embedded partially in the pelvis near its junction with the ureter. Healed well. Lost sight of.

Case 3.—E. H—, æt. 32. Four years ago hæmaturia, painless, quite sudden, and causeless. In two months or so pain in left loin, and then gradual appearance of characteristic symptoms of renal calculus. Father died of phthisis. Small crystalline oxalate of lime stone found fixed in pelvic cavity.

(5) *Symptomless Renal Hæmaturia in Rare Cases of Deposit of Crude Tubercle in the Submucous Tissue of the Renal Pelvis.*

Probably the rarest cause for renal hæmaturia of the *painless,* symptomless type is the sloughing out of a deposit of crude tubercle in the mucous membrane of the renal pelvis. In such cases the hæmorrhage is profuse and alarming, but it is generally accompanied or rapidly followed by renal pain; in fact, although I have had over 200 cases of urinary tuberculosis, I cannot count more than six probable cases in which painless hæmaturia has been the onset of symptoms of primary renal tubercle. Even these are not absolute without the cystoscopy, because painless profuse hæmaturia occurs in primary vesical tuberculosis in 4 per cent. of all cases.*

G. S—, æt. 27 (O. P., vol. xvii, 22). Twelve months ago, after cycling, he passed bloody water; there were no other symptoms. The bleeding recurred at intervals after any exercise or exertion. Three months ago pain in right loin, of a dull aching character, and fixed. Now a right renal tumour and an evening temperature. Urine 1012, acid, albumen, pus; clumps of tubercle bacilli (Eastes). Lost sight of case.

I may add that I am always suspicious of urinary tuberculosis in the *profuse* hæmaturia of young people æt. 12—21.

Dr. Newman † has written on the subject and has given four cases, but all had pain coincident with the hæmaturia.

Routier ‡ records a very convincing case.

* My last case was brought me by Dr. Hewer at Easthorpe, a young fellow passing occasionally pure blood painlessly and without any vesical irritability. This had been noticed for two years. The urine contained tubercle bacilli, and on the right side of the bladder and low down on the posterior wall were sharply cut, bloody edged, tuberculous ulcers.

† Newman, "Hæmaturia an Early Symptom of Renal Tuberculosis," 'Lancet,' August 26th, 1899.

‡ Routier, 'Bull. et Mém. de la Soc. de Clin. de Paris,' vol. xxi, p. 148.

A man æt. 28, in whom the first symptom of tuberculosis was a profuse hæmorrhage, which continued seventeen days, followed by renal colic and a frequent desire to empty the bladder. Cystoscopy showed blood running from the right ureter. The kidney was removed, and tuberculous ulceration was found limited to two calyces.

Conclusion.—We have seen that five distinct pathological changes produce a renal hæmaturia, and that the bleeding may be present without other objective or subjective symptoms.

The cystoscope can not only demonstrate the absence of any bladder cause for the hæmorrhage, but it can correctly indicate which kidney pelvis is at fault, and decide as to whether the renal tissue is crippled or inactive or overactive. But of differential diagnosis less can be claimed for its use. The instrument may show the orifice to be elongated and darkly congested, from which it may be inferred that the renal pelvis is dilated; or it may demonstrate large trunklets entering and emerging, and thus raise a suspicion of renal growth, just as a left-sided, rapidly growing varicocele, after middle age, may hint at left renal cancer. It may warn the clinician that inflammatory trouble complicates the case by showing swelling and pouting of the ureteric lips, but it cannot be relied upon for more than this.

Every other method of examination should be utilised to determine the *cause* of the hæmorrhage. Chief amongst such diagnostic aids is microscopy: the clinician, however, remembers that a few casts * may be found in all three groups—chronic nephritis, malignant growth, and renal stone; but that when numerous they indicate usually a chronic granular nephritis.

Crystals, when numerous, and especially if of the lime

* Stintzing regards the absence of tube casts in chronic renal affections as characteristic of renal tuberculosis. This certainly will not prove correct when the disease has started from the bladder and irrigation of this viscus has been carried out, for a slight septic pyelonephritis may ensue, and casts are then found in the urine.

phosphatic type, indicate a possible phosphatic-covered stone. Clumps of abnormal cells not infrequently point to neoplasm. Radiography is of real value in negativing stone.

The two diseases difficult to diagnose, except by exclusion, are the angiomata of the papillæ and the breaking down of crude tubercle in a calyx. It should, I am sure, be a golden rule always to explore every case of profuse renal hæmorrhage, and to be prepared for nephrectomy. Whilst in the persistent and moderate renal bleedings attention should be directed to the condition of the pelvic mucous membrane, in the profuse hæmaturia the cortex should be searched for the unevenness or hardness of carcinoma.

CHAPTER V.

HÆMATURIA ACCOMPANIED BY DEFINITE RENAL PAIN.

THE last chapter was devoted to the consideration of those renal diseases which proclaimed their presence only by blood in the urine—to cases in which the cystoscope deftly and wisely used was not only of value, but indispensable in outlining accurate and judicious surgical treatment.

But renal disease, symptomless with the exception of hæmaturia, is the exception and not the rule. Most often distinct and definite renal pain draws attention to the site of the disorder, and *generally* indicates the origin of the blood which is noticed in the urine.

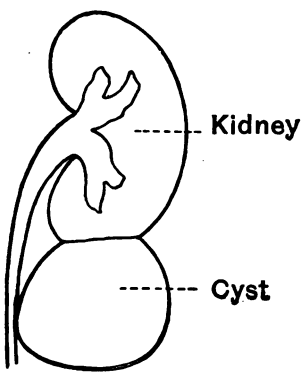
Under these circumstances some operating surgeons argue that cystoscopy is not only useless, but misleading; that pain is a sufficient clue to the locality of the mischief; and that a nephrotomy should be carried out on that side on which the pain is experienced. This advice is sound, but in my judgment not always safe. In the greater number of cases met with the pain is an all-sufficient guide to the disordered kidney. Occasionally, however, a slight pain is on the opposite side, and is always due, if I may venture the suggestion, *to increased activity of the sound kidney*, labouring to compensate for the crippled condition of its diseased fellow. This opposite side pain is in many cases not a referred pain, as some have contended, but due to increased local vascular tension. I therefore advocate very strongly the use of the cystoscope in all hæmaturias with *slight* renal pain.

I give a few illustrations of this, and one failure, when a routine cystoscopy was not carried out.

I was asked by Dr. Alfred Ryan, of Chelsea, to see a case of obstinate hæmaturia in a man æt. 36. The cystoscopy was carried out with difficulty and in an awkward position, but without noting which orifice I was looking at I saw a copious efflux of dark brown urine. As pain was complained of in the right kidney I concluded it was right renal hæmaturia, and said so. The bleeding remained obstinate; I found myself forced to interfere. Before doing so I re-examined with the cystoscope (as this is my routine practice). To my surprise the bleeding came from the left ureteric orifice. I cut on the left kidney. The patient was cured to the extent that the bleeding was arrested, and he had no further pain in the right kidney.

A lady was sent to me by Dr. Lloyd, of Abergavenny, for hæmaturia and pain and tenderness in the *right* kidney. With the cystoscope dark blood was seen to trickle feebly from the *left* ureteric orifice. I immediately operated upon the left kidney, and dis-

FIG. 26.



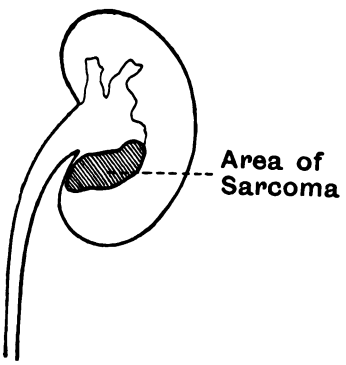
covered a large cyst projecting from the back of the tail (Fig. 26); it was full of blood-clot and grumous blood. It did not apparently communicate with the pelvis, but probably pressed on the vessels. I cut it freely away, stitching over the edges. The lady was cured, but always insisted I had made a mistake in operating on the wrong kidney.

J. D—, æt. 55, was sent to me by Dr. Chapman, of Hereford, with profuse hæmaturia. The patient had noticed it for two and

a half months. It was accompanied by pain in the right kidney and over McBurney's point.

On cystoscopy.—The right ureteric orifice was healthy, but the left was a large swollen-edged slit, such as one sees in a thickened ureter of long-standing renal inflammation. The efflux was a blood trickle. There was no renal tumour. I cut on the left kidney, and found it was much attached; I removed it. Its pelvis was dilated with a mass of loose sarcoma which had sloughed off from a mass of sarcomatous growth in the lower part of the pelvis (Fig. 27).

FIG. 27.



Sarcoma breaking into the lower pelvis of the kidney.

Slight renal pain may delude the cystoscopist into examining the wrong orifice. I have several times seen a cystoscope burn situated near the orifice of a ureter in hæmaturial patients who complain of renal pain or discomfort on the same side, but I have found blood issuing from the opposite ureter! In other words, previous observers have been so diligently and so fixedly watching the ureteric orifice of the painful side that they have burnt the periureteric area, and in addition have not noticed the hæmaturia issue from the other side. I could quote a number of cases on this point. Seeing, then, that pain is not altogether reliable, the use of the cystoscope in hæmaturia accompanied by *slight* local renal pain is advisable.

There is, however, another aspect of the subject,

and this deals with obstruction of the vesical orifice of the ureter by carcinoma of the bladder, a condition which necessarily evokes pain in the corresponding kidney on account of the back pressure exerted by the obstruction, in addition to hæmorrhage from the cancerous surface. The question should always be asked, "Is the renal pain caused by any back pressure exerted at or near the bladder orifice of its ureter?" In a fair proportion of vesical carcinomata this causation of renal pain is present, and it can be demonstrated by the cystoscope. I have had a very severe clinical lesson on this subject, and I quote the case in which I failed as an illustration.

H—, æt. 40, was sent to me by Dr. Smith, of Plumstead. The patient complained of right kidney pain which extended to the groin and bright hæmaturia on exertion; he had no other symptoms. Contrary to my invariable custom I did not cystoscope, but explored the right renal region, as the pain was so entirely local and renal in its position. A hard, movable, slightly hollowed right kidney was found. Nothing further was done. The operation was followed by retention and a difficulty in catheterisation, which made me examine the prostate and the bladder base. This latter was found indurated. He left the hospital but died of suppression. I obtained an autopsy, and proved that the right renal pelvis and ureter were dilated, the bladder orifice of the right ureter being blocked with cancerous growth. Had I followed my routine practice and examined him with the cystoscope I could have seen the vesical carcinoma, and would not then have subjected him to the useless operation of renal exploration.

It might hardly be credited that a benign villous papilloma, situated near the orifice of a ureter, could cause the corresponding kidney to "ache," or even to become the site of definite suffering. But it is so, exceptionally. I have met with a few cases.

Not long ago a boy of fourteen was sent to me by Dr. Henderson, of Balham, with symptomless severe hæmaturia and an aching left kidney. Over the left side of the belly was a long scar, evidently the route of a transperitoneal exploration of the left kidney. I learnt that the boy had been for three months in one of the London

hospitals, under one of our very able surgeons, and had had the left kidney explored, the diagnosis being malignant kidney; the organ, however, was found perfectly healthy. This was three years ago, and the symptoms had continued since then unchanged,—there was still profuse recurrent hæmorrhage and left renal pain.

With the smallest cystoscope I first demonstrated a large villous papilloma dragging on the left ureteric orifice, and then removed it supra-pubically. He was quite cured of the hæmorrhage and the renal pain.

But to return, marked attention was drawn in the previous chapter to certain hæmaturial affections of the kidney which were often painless. *But "painless" hæmaturial diseases of the kidney are the exception, not the rule.* In order to emphasise this fact, I propose to devote a few pages to several of those diseases of the kidney which entail suffering as well as hæmorrhage, and in order to arrest the attention of the rapid reader I will place these groups in parallel tables.

Pronounced Hæmaturia without Pain.	*Pronounced* Hæmaturia with Pain.
1. Chronic granular nephritis. (Not uncommon.)	1. Chronic granular nephritis, infected. (Rare.)
2. Angioma or capillary nævus of a renal papilla. (Rare.)	2. Local interstitial nephritis due to twist or narrowing of, or obstruction to the ureter. (Not uncommon.)
3. Benign or malignant growth of the kidney. (Not uncommon.)	3. Benign or malignant growth of the kidney. (Not uncommon.)
4. Cases of embedded aseptic calculus. (Rare.)	4. Calculus of the kidney. (Common.)
5. Submucous deposit of crude tubercle. (Very rare.)	5. Tubercle of the kidney. (Not uncommon.)

A cursory glance at the two columns will show that they contain almost identically the same forms of disease, so that one might say every disease of the kidney producing blood in the urine may have a painless or a painful course.

1. *Pronounced Hæmaturia in Cases of Chronic Granular Nephritis with Local Pain as a Prominent Symptom.*

The clinical life of granular kidney, or, in fact, of any chronic form of so-called Bright's disease, is rarely marked by any local pain, if we except the dull ache which is experienced across the back. Cases, however, are met with in which chronic nephritis is associated with marked pain in the region of one kidney, the suffering being localised to the front and to the back of that organ.

This epiphenomenon—pain—appears in most cases to be due to the presence of some disturbing influence which is present in addition to the nephritis. Thus uratic or oxalic gravel will determine a renal ache in a kidney affected by chronic nephritis, and may indeed induce decided suffering.

Mobility of a granular kidney is another and, I believe, a frequent cause for the additional symptom of local pain, some back pressure on the pelvic mucous membrane being exerted by the bending or kinking of the ureter.

Inflammatory changes ascending the ureter and invading a granular kidney in women from even a transient cystitis acquired during pregnancy, or under other circumstances, have been in my opinion an occasional cause for local renal pain in chronic nephritis.

Finally, there are cases in which no cause can be discovered for the pain beyond the nerve disturbance which is invariably associated with that crumpling of the cortex which is the pathological characteristic of the disease.

At present we may divide the accessory influences which graft unilateral pain upon the symptoms of chronic nephritis into three groups: calculus irritation, pelvic distension, septic infection.

The intercurrent affections need not be discussed here, but a few remarks upon the obscurity which they import into cases of chronic nephritis may not be inappropriate.

The Similarity between Irritated or Infected Nephritis (Hæmatogenous), and so-called "Surgical Diseases of the Kidney."

Cases of irritation or infection of a kidney which is already the subject of chronic nephritis fall into a class which is clinically intermediate between the so-called medical and surgical diseases of the kidney. In such borderland cases there is often much obscurity in diagnosis, and occasionally some uncertainty about the propriety of operative interference.

Take, for instance, the similarity which exists between an infected chronic nephritis and aseptic stone in the kidney. In both there may be unilateral pain, a few casts, a little blood, a little albumen, even a medium specific gravity; no marked arterial tension nor any cardiac hypertrophy. The fact is, expert urinalysis, with its improved appliances, especially the centrifuge, has weakened and confused the abrupt lines and limits which we are accustomed to employ in separating these diseases.

If we diagnose superficially and rely on the subjective signs of pain, infected nephritis may resemble renal stone very closely.

For instance, the symptom of renal colic which is so much relied upon as diagnostic of renal stone may be simulated by interstitial nephritis.

Mr. Mansell Moullin records a case of a woman æt. 34, who was admitted into the London Hospital for right renal colic, from which she had suffered at frequent intervals for two years. Between the attacks she had chronic and persistent aching across the loins. She passed urine frequently, sp. gr. 1012—1014, 40 oz. per diem, which contained blood, and a small quantity of albumen when blood was absent, and generally a deposit of urates. Casts are not mentioned as being present or absent. The arteries were hard and the heart slightly hypertrophied. There were no retinal changes.

Exploration of the kidney was carried out, but no stone was found, and the colics continued after forty-eight hours greater even in severity than before. The woman died a few days after the operation of exhaustion. On post-mortem nothing was found but well-marked granular kidneys.*

But the suffering in these exceptional cases of complicated chronic interstitial nephritis may extend beyond the limits of the kidney area. It may be located in the bladder, and the patient suffer greatly in that organ. In such cases it is not necessary to regard infection as a necessary cause. Extravasation of blood under the mucous membrane may be the disturbing factor.

In one case of granular nephritis which came under my care all the classical symptoms of stone in the bladder were present—pain, frequency, and blood. On cystoscopy, however, the causation of the lower urinary symptoms was proved to be an extravasation of blood under the mucous membrane around and in the neighbourhood of the ureteric orifice, an extravasation which did not probably differ from other hæmorrhagic manifestations noticeable in granular nephritis, such as epistaxis, hæmatemesis, melæna, yet its presence in this particular part of the urinary tract was sufficient to induce intolerable suffering and to mask the real site and cause of the trouble.

The Value of Cystoscopy in Infected Bright's Disease.

Of what value is cystoscopy in chronic nephritis with pain? It is rare to find any change in the ureteric orifices. There may be evidence of inflammation of the bladder and swelling of the ureteric orifice, and upon these grounds the cause of the pain and the source of infection of the kidney may be surmised,—or the ureteric orifice of the painful side may be turgid, and dilatation of the pelvis diagnosed; but I do not consider that

* 'Clin. Soc. Trans.,' vol. xxv, p. 56, 1892.

cystoscopy will throw much light upon the diagnosis. It merely enables the surgeon to select with certainty the kidney if it is bleeding. If only local suffering is present it can only aid us by eliminating all sources of vesical disease causing renal pain.

Diagnosis and treatment.—In dealing with a case in which marked renal pain is accompanied by slight evidences of chronic nephritis I rely upon very thorough and repeated microscopy of the urine, upon careful examination of the blood and cardio-vascular system, and upon evidence of functional disturbances in the digestive, respiratory, nervous, and cutaneous tracts to establish the presence of confirmed nephritis. I do not hesitate to advise exploratory incision * if retinal splashes are absent and cardio-vascular changes are slight or unimportant. Edebohls does not hold his hand even for these evidences of advanced Bright's disease.† If the kidney aches because of its mobility, the mere operative manipulation is sufficient to fix it. If the kidney is painful from ascending inflammation, the blunt separation of the cortex from all adhesions is quite enough to relieve the patient of pain for an entire year. Moreover, if the capsule be reflected after Edebohls' method, there is some chance of improving the future health of the kidney.

Exploration, in such cases, is surgical, if it be under-

* I believe a small proportion of cases of *negative* kidney exploration for stone are instances of irritated or infected chronic nephritis.

† Edebohls says: "Of the thirty-two cases of advanced chronic nephritis operated upon during 1902, very few indeed were uncomplicated or but slightly complicated cases of chronic Bright's disease. Nearly all presented minor, greater, or extreme cardiac and vascular degenerations, arterio-sclerosis, hypertrophies of all degrees up to the point of non-compensation beginning, predominant dilatation, pericarditis, and endocarditis. Pleuritis and hydrothorax as complications were by no means rare, while one patient had cavities in both lungs, and two patients suffered from cirrhosis of the liver in addition to chronic Bright's disease. The cerebral and ocular complications were represented by hemiplegia due to changes in the cerebral vessels, to embolism, thrombosis, etc., and by the characteristic retinal lesions." The mortality was 13⅔ per cent.—'Med. Press and Circular,' April 29th, 1903, p. 429.

taken with the knowledge that the kidney structure is affected, and if the line or method of attack be modified accordingly.*

2. *Pronounced Hæmaturia with Pain in Local Interstitial Nephritis (Non-hæmatogenous).*

Local interstitial nephritis is a wide and difficult subject. A few prefatory words are therefore needed to designate the exact class I wish to draw attention to.

It is well known that a localised form of chronic interstitial nephritis follows the healing of wounds, abscesses, infarcts, and gummas in the kidney, the destroyed tissue being eventually replaced by scar tissue, and the surface of the organ being correspondingly puckered.

These several conditions may be localised to small portions of the kidney or involve the entire organ, but are not coincident with somatic changes. As a rule † they are

* It is always judicious, I think, to avoid laying open the kidney structure freely when there are obvious signs of chronic parenchymatous or interstitial nephritis present.

† An exceptional case from my case-book:—Infarct of the kidney; severe pyelo-nephritis; persistent hæmaturia; cystoscopy; nephrectomy; cure.—Dr. Sykes, of Croydon, sent me a gentleman, æt. 40, with the following letter:—"This case is characterised by an absence of all symptoms but bleeding, and it has been mooted to make an exploratory incision down to the *left* kidney. Lawson Tait and I think the symptoms are too vague to justify such a course at present, and we should like your advice." The gentleman had been passing dark blood for some months. There was no tubercle in the urine, only blood-cells.

Cystoscopy (April 7th, 1899).—A decided whipcord-like mould of darkish blood was seen issuing from the *right* ureteric orifice. The left ureteric orifice was patched with extravasation, which I supposed was the result of a recent cystoscopy made by an inexpert operator.

Inference.—Right renal hæmorrhage from an inactive kidney.

Operation.—Right lumbar incision. Kidney *not* movable. Dark blood beneath true capsule, which was raised over considerable areas, especially towards the lower pole, and stripped off only too readily where it was not already detached. The kidney surface was decidedly granular. Its consistence varied, here firm, there thin and dimpling. I removed it, finding it very adherent at the upper end. It was hollowed out in every part, the cortex being a mere shell towards the lower pole (where

not accompanied by persistent or marked hæmaturia, and I do not propose to deal with them here.

There is another form of local interstitial nephritis which is usually more or less of a diffuse form, and follows pyelo-nephritis. It is to this, and more especially to a variety of this, I wish to draw attention.

The severity and extent of the interstitial nephritis depends, of course, upon the degree and duration of the exciting cause. In most, the change is at first limited, and this is the time for operative relief, for it is always *progressive*, and ends with the entire destruction of the gland.

The cases are often obscure clinically, and many, I am sure, have been diagnosed and treated as Bright's disease in the past; even now they are liable to be confused with infected or irritated Bright's disease. A very excellent illustration of the similarity is recorded by Dr. Bagshawe * in the 'Pathological Transactions.'

The case was that of a man who died at the age of 62. At the age of forty-two he had dropsy and general anasarca, and he was told he would always be liable to it; but he recovered completely, and on his death, twenty years later, from suppression of urine his left kidney was found atrophied and the ureter impervious. The right weighed 7 oz. and its structure generally was healthy, though microscopically some evidence of disease was found, and the gland had suffered from backward pressure.

Death was due to suppression arising from the block of the right ureter by a dark-coloured plug of calculous *débris* and blood.

It might be fairly surmised that the dropsy and general anasarca was due to sudden incapacity of the left kidney

the true capsule had been found detached). The mucous membrane lining the recesses was darkly blood-stained. A pale long clot was removed from the pelvis.

The section of this kidney shows a triangular patch of chronic inflammatory growth extending inwards from the cortex. This is very probably the remains of an old infarct.—J. H. Targett.

* "Suppression of Urine for Ten Days," by Dr. Bagshawe, 'Path. Soc. Trans.,' vol. xvi, p. 176.

twenty years before death. May not some of the cases of transient severe albuminuria be due to plug of the renal artery or embolism in the renal substance, which places the whole or part of the kidney *hors de combat ?*

Three main causes are, I submit, provocative of local interstitial nephritis (non-hæmatogenous).

a. The most common is inflammation of the lower urinary tract ascending one ureter (or both).

b. Some form of ureteric obstruction—either an acute bend of the ureter, due to adhesion or mal-insertion in movable kidney, or a valve, or a vessel-leash bowstringing the ureter, or a stone impacted low down in the ureter. In all, there is generally infection in addition to the obstruction.

c. Intermittent strain on the renal vessels.

I do not wish to burden the text with examples of the first or of the second class. One striking illustration will suffice.

Kink of ureter at the uretero-pelvic junction; back pressure; hollowing of kidney; chronic pyelo-nephritis; severe hæmorrhages and renal pain.—A gentleman, æt. 33, consulted me in reference to attacks of right renal pain and hæmaturia. His mother had died of phthisis. His symptoms had lasted ten years, but were increasing in severity. He described the attacks as follows:

"The attacks now come on about every three weeks at night, and last from twelve to forty-eight hours. It commences with a feeling of discomfort at the back of the right kidney, sufficient to wake me and keep me awake. I cannot lie on that side nor on my left, but turn on to my back. It soon becomes real pain and spreads to the front of the kidney, but not to the bladder. Both back and front become exquisitely tender. I do not wish to make water often,—in fact, there seems a scarcity of urine, but what I make is quite clear. I usually vomit with the pain. The end of the attack is often announced by a feeling of something giving way, and I get up at once, being seized with a sudden and great desire to urinate, and pass at once 14 to 17 oz. of brightish blood and water. The pain is now gone, and the blood gradually diminishes and is gone in a week. In between the attacks the urine is clear, and contains only oxalates.

"Alcohol, constipation, and flatulence seem decidedly to bring

on attacks. Contrexeville cures are useless, but Carlsbad (Sprudel) courses are beneficial, so also is a liver pill. Between the attacks I am in perfect health."

An exploratory operation was performed. The kidney was found to be somewhat shrunken and hollowed out by back pressure; the pelvis was distended, and the ureter narrowed at its junction with the pelvis and somewhat kinked. It was repaired in the usual way, and the patient regained his health.

I have had several almost similar cases.

Intermittent Strain or "Tug" on the Renal Vessels, producing a Local Chronic Interstitial Nephritis which is characterised by Renal Pain and Blood.

Some time before Newman * drew attention to the subject "of increased vascular tension in the kidney as a cause of renal pain, hæmaturia, and albuminuria with or without tube casts," I had been forced to accept as a working diagnosis that drag or tug upon the renal vessels, especially an aberrant artery to the lower lobe of the organ, was liable to induce local interstitial nephritis and to cause pain and blood.

I first met with it in a case of movable kidney, feeling a thick artery like a radial passing to the lower pole from below (*vide* Fig. 28). The thought at once passed through my mind that this aberrant vessel acted like a tent guy, and prevented the kidney being in its place under the liver. But while the kidney remained loose, every drag upon it would do harm to that area of the renal tissue supplied by the artery. I did not divide and tie the vessel, but fixed the kidney in the loin so that there was no strain placed on the vessel. The patient lost all her symptoms.

Since then I have had cases in which I could not resist the conclusion that drag on the vessels is more often concerned in atrophy of parts of the kidney, and in patchy surgical interstitial nephritis, than I had realised

* Newman, 'Renal Cases,' p. 1, 1899.

at first. It is quite conceivable that any sudden interruption of blood-supply must have a deteriorating effect upon the delicate renal tissue; and when this interruption takes place, as it may do several or many times a day by the drag of a recently displaced kidney, or by the sudden stretching action exerted on the vessels by a dilated

FIG. 28.

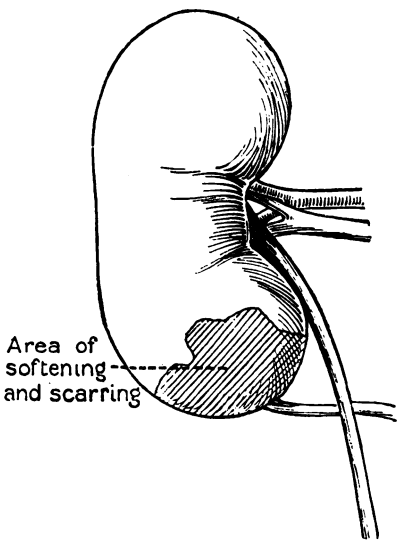


Diagram of irregular artery to lower pole, the area of softening and scarring being found when there was a distinct drag on the artery.

pelvis, that congestion, inflammatory exudation, and atrophic changes must result, and the clinical symptoms of albuminuria or of hæmaturia may ensue.*

* Dr. George Robinson showed that obstruction to the renal vein caused both hæmaturia and albuminuria ('Med.-Chir. Trans.,' 1843). Senator proved that by obstructing the renal vein for a short time in a living animal albumen and blood could be easily detected in the straight tubes, while Bowman's capsules were free; but if the pressure were more prolonged, the mechanical hyperæmia caused blood to escape into the Malpighian capsules also. Herman and Overbeck have demonstrated

Now it is conceivable that the leash of vessels most liable to be dragged upon is that running to the lower pole (Fig. 29), because they are more often stretched by the greater mobility of the freer end of the kidney; but if the vessels are inserted near the upper pole, as they sometimes are,

FIG. 29.

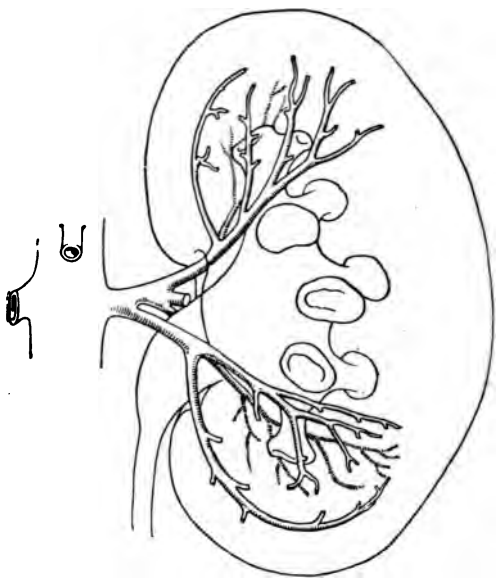


Diagram of arterial supply to kidney. (Max Brödel.)

and course over a distended pelvis, they are also liable to overstretching in proportion to the distension of that cavity.

I suggest that there are two appearances of the kidney (when lying *in situ*, with its vessels unstretched by delivery on to the loin and its cortex undamaged by manipulation) which may give a clue to the presence of

that even slight disturbances of the renal circulation cause suppression, which may last for a longer or shorter period according to the sensitiveness of the individual, and that albumen and blood may appear in the urine for hours and days afterwards. (Quoted from Newman, 'Renal Cases,' p. 16.

local interstitial nephritis due to intermittent drag on the vessels :

A. Abruptly Marginated Whitish Areas of the Cortex.
B. Dark Blood Bullæ with Detachment of the Capsule.

A. **Abruptly marginated whitish areas of the cortex.**

The lower pole, even the lower third of the kidney, may be seen to be of dull white colour. This area is sharply marked off from the dull red of the remainder of the apparently healthy cortex. The capsule over the area may strip at a touch, or it may come off with difficulty, and then little patches of the cortex come away with it. This difference in capsular detachment varies according to the age and stage of the patch of nephritis. The cortex of the impaired area is usually smooth, white-greyish-yellow; it is soft, and tears easily (Fig. 28). Section from it shows a fatty change in the epithelium and a marked state of chronic nephritis. Sometimes the surface of the area is distinctly granular, but I have never seen this change so abruptly limited as the whiter.

It is right to say that in the cases of " white areas " I have studiously avoided those in which the change could be attributed to " corset pressure " on the kidney; but even here, according to Rovsing of Copenhagen, torsion of the pedicle may produce hæmorrhage. One of his cases is as follows :

Mrs. P—, æt. 56, admitted May 17th, 1897. She had been perfectly well until 1885, when, after a fatiguing day's washing, and after having lifted heavy tubs, she noticed blood in her urine. This bleeding recurred twice in twelve years, each time after severe exertion.

On admission she was of a dirty cachectic aspect, and was emaciated. On the right side a large, hard tumour could be felt in the kidney region. Cystoscopy showed a considerable stream of bloody urine from the right ureter. The urine did not have any smell. It was of a deep, dark blood colour, and yielded a high red deposit, which under the *microscope* showed numerous red, a few white corpuscles, and many small motile bacilli, found on cultivation to be *Bacterium coli.*

The diagnosis was malignant tumour of the right kidney.

On the 20th of May, 1897, right lumbar incision was performed under chloroform. Rovsing found the kidney displaced downwards in a remarkable oblique position, with its upper pole turned towards the vertebral column, the convex border turning forwards and upwards, so that the kidney seemed to have made half a turn upon the pedicle. The kidney was kept in this position by the very pronounced lacing-liver, the furrow of which was exactly opposite to the upper edge of the kidney, whilst the kidney was behind and *adherent* to the posterior surface of the lobe of the liver, so adherent that it could not be detached without making a 2-inch split in the peritoneum. It was evident that the hard tumour Rovsing had felt was kidney *plus* liver, not the kidney alone. The kidney, which was certainly a little enlarged, being especially longer than is normal, and bluish on the surface, was brought through the wound. Forceps were placed on the pedicle, and a complete division of the kidney from the convex border into the pelvis was then performed without any bleeding. The tissue was cyanotic, but otherwise normal in appearance; no calculus or tumour could be found; the pelvis perhaps a little dilated, its mucous membrane smooth and pale. After *excision of a piece of tissue* for microscopical examination the kidney was united with catgut sutures and replaced in its normal position, where it was kept by a pad of sterile gauze placed beneath its inferior pole, after which the lumbar wound was closed.

The next day (21st of May) the urine was clear, not tinctured with blood. On 1st of June the urine did not give chemical blood reaction, but a slight quantity of albumen. On 7th of June the urine was without albumen, but there was still *Bacterium coli*. After two months' treatment with salol and distilled water (1½ to 2 litres daily) the urine was quite sterile. During the year which has elapsed since operation the patient has been quite healthy and the urine normal (last examination on the 2nd of July, 1898).

The *microscopical* examination of the extirpated tissue showed stasis in the veins and the capillary vessels. No infiltration of round-cells. In the tubuli recti a number of small staff bacteria.

Rovsing* remarks on this case, "I suppose that the bleeding was caused by the stasis in the veins produced by the torsion of the pedicle of the displaced kidney."

* 'Brit. Med. Journ.,' 1898, part ii, p. 1547.

Author's Case illustrative of Change in Lower Lobe, the Probable Result of "Drag" on Vessels.

A patient, æt. 23, was sent me by Dr. Greene, of Cheshunt. She had been in various institutions with a right movable kidney, pain, and hæmorrhage. Various appliances had been tried, but all had proved unsuccessful.

On cystoscopy the right ureteric orifice was thin and open, but the left ureteric orifice was much more affected than the right.

As the pain was right-sided and the kidney was freely movable, whilst the left kidney could not be felt, I cut on the right.

The kidney was long and hollowed by back pressure. A leash of vessels entered the pelvis at the usual position, and a separate leash ran to the tail from below. The lower third of the organ was white, softened, and scarred (Fig. 28). Upper two thirds appeared quite normal.

I fixed the kidney. She recovered, and a year later was free from symptoms.

I may add the following cases which bear on the subject. Both seem to me to be good examples of the evil effects upon the renal tissue of the action of the combined forces of pelvic or ureteric obstruction and stretching of the renal vessels.

Case 1. *Bowstringing of ureter by an aberrant artery to lower lobe of kidney; dilatation of pelvis; extreme atrophy of parts of kidney supplied by aberrant artery.*—A lady, æt. 41, was sent to me by Dr. Pinching, of Gravesend. She had "influenza" in November, 1898, and noticed a cloudy deposit in the urine. It has been habitually murky since then. In February, 1899, another attack of "influenza" starting with a rigor. Since then an increasing bodily weakness. September, 1900, another rigor, after which she passed porter-coloured urine without vesical irritability. Severe occipital headache and fever. In four weeks she had six separate attacks, each being heralded by the *water clearing*, the temperature rising, and culminating in a rigor. Pain was then felt in the left kidney, pus appeared in the urine, and the attack subsided without sickness. No tubercle bacilli were found in the urine.

On cystoscopy the bladder was shown to be healthy, and the right ureteric orifice pumping freely a urine of low specific gravity; but the left ureteric orifice was oval and open, and it worked with much spasm of the adjacent interureteric bar.

Diagnosis.—No stone or tubercle, but a dilated left kidney. Cause unknown.

Operation.—Left lumbar incision.

Kidney very adherent, much atrophied, parchment patches alternating with islets of thick cortex. It proved to be a multilocular sac. I removed it by skinning it out of the capsule, but it was much attached, and I was forced to leave here and there patches of russet-brown kidney tissue adhering to the capsule. The pelvis

FIG. 30.

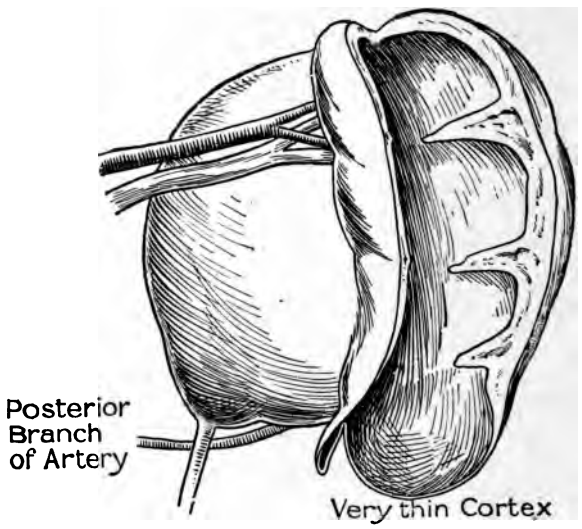


Diagram of irregular artery, bowstringing the ureter, which probably caused spasm in the artery, and therefore an intermittent vascular supply to lower lobe.

was dilated; the vessels were in two groups (*vide* Fig. 30), an upper and a lower, and the latter crossed the ureter just where it joined the dilated pelvis. It was noticeable that the lower pole of the kidney—that supplied by the lower vessel leash—was white in colour and so atrophied as to be thin as parchment, but the upper had a thicker layer. There was no stone.

This suggested to my mind a vicious circle; the vessels had been bowstringing the ureter, perhaps setting up a local spasm in that tube at the site of crossing, which would further accentuate the back pressure caused by the mere flexure, and had produced the dilatation of the pelvis. There was no true stricture of the ureter—14 E passed easily.

It also seemed to me that the intermittent extension or pull on the lower leash by the varying movements of the lower pole in distension had induced the marked atrophy of the lower pole.

Another case:

Case 2. Extreme atrophy of upper pole of kidney; dilated pelvis and ureter from stricture of lower ureter; overstretching of renal vessels.—Mrs. J—, æt. 37, had suffered from attacks of pain in right kidney, pyelitis, and intermittent ureteric block ever since removal

FIG. 31.

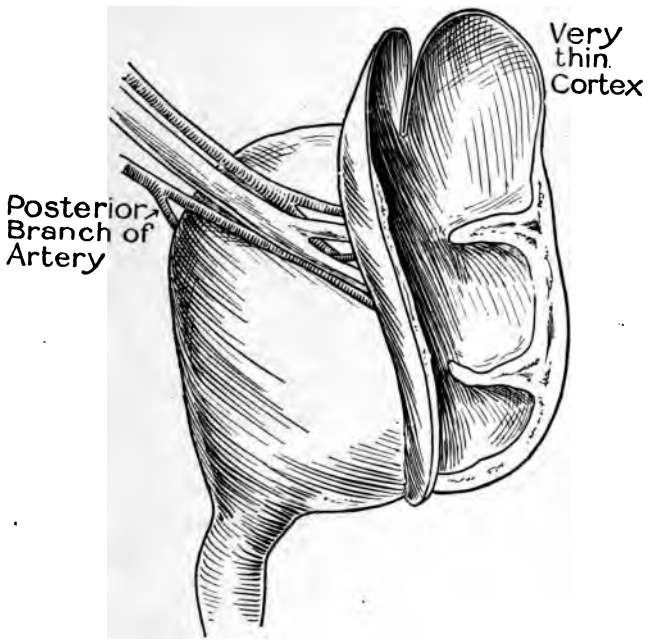


Diagram of dilatation of pelvis stretching upper leash of renal vessels.

of the right ovary. I found on cystoscopy the right ureteric orifice enlarged and patulous, the left healthy. I explored the right kidney, and found it and the entire right ureter down to the position of the ovary very dilated. The upper lobe of the kidney was fixed, dilated, and the cortex there was as thin as cartridge-paper—much adherent to the liver (Fig. 31); the pelvis was much dilated, and as the vessels were inserted high up they must have been subjected to severe overstretching when the ureter became temporarily closed. The vessel running behind the pelvis to the tail escaped, perhaps, for there was much more cortex in the area supplied by that artery than anywhere else. I roughly formulated for myself, trusting to

future experience to correct the errors in interpretation and supplement deficiencies in observation, the following rule:

If a leash of the renal vessels is so placed as to be intermittently overstretched or spasmodically affected, that part of the kidney structure supplied by it will suffer, becoming thinner and softer than those more equably supplied with blood.

B. **Dark blood bullæ with capsular detachment.**

Now and again the operator will meet with a blood blister—the capsule being raised from the cortex by a collection of dark fluid blood and urine. I considered at first that this was due to the roughness of my manipulation, but I have met with it in cases of movable kidney, and have noticed it before I have commenced to separate the organ from its bed. I have also found it present in cases of inflamed fixed kidney, where it would seem that the blood-supply has been damaged.

I have usually found it towards the lower pole of the organ, but it may be quite extensive and embrace half or nearly all the gland. On tearing the detached capsule and sponging off the blood, the surface will be found coarsely granular, and perhaps with scars of commencing interstitial change. I believe in every case in which I have noticed this detachment of capsule with blood between it and the cortex, that the vessels have been intermittently stretched, and the tissue of the gland, especially the cortex, affected. No kidney with this condition has appeared to me healthy; in all I have noticed some local inflammatory change (local interstitial nephritis) which ultimately might lead to scarring.

The remaining items of the group need not detain us here. Pain in the kidney, with hæmaturia, is among the characteristic and most frequent symptoms of renal carcinoma, stone, and tubercle. The value of ureteric meatoscopy in stone and tubercle of the kidney is of sufficient importance to necessitate a separate chapter being devoted to each, whilst the cystoscope in renal carcinoma with pain and tumour—for the latter is generally present with the former—is not of much value.

CHAPTER VI.

THE VISUAL CHANGES IN THE URETERIC ORIFICE AND ITS EFFLUX WHICH MAY BE CAUSED BY A RENAL CALCULUS.

For the sake of clearness of description it will be as well to divide this subject into three separate sections.

1. The aspect of the vesical orifice of the ureter of a kidney in the pelvis of which a stone is imprisoned.

2. The aspect of the orifice of the ureter along which a stone *is* descending.

3. The aspect of the orifice of the ureter in which a stone has become arrested in transit.

1. *The Ureteric Orifice in Imprisoned Pelvic Stone.*

When a stone, whether of the oxalate or urate type, has formed in the pelvis or some deep calyx of a kidney, it does not manifest its presence at first by any characteristic visual changes in the ureteric orifice. In a very few instances when the stone is small and crystalline surfaced, no other symptom may be present beyond an intermittent "symptomless" hæmaturia. No pain is felt by the patient as a guide to the organ affected, and in these instances the efflux of blood from the ureter is of course readily detected, and the site of the disease is as readily diagnosed. Such a kidney will frequently secrete very rapidly during the occurrence of the hæmorrhage, and the jets will issue from the orifice one after another in rapid succession—an activity which is probably characteristic of a reflexly irritated kidney. But beyond this intermittent hæmaturia and the hypersecretion when the bleeding is present, there is no

change in the contour or aspect of the ureteric orifice to mark the presence of a small crystalline surfaced stone imprisoned deep in the renal pelvis.

If, however, the stone does not find its way along the ureter, three groups of sequential changes may occur in process of time in the renal pelvis and gland tissue. These mark the three grades in the destructive effects of renal stone, and each grade *may possibly** cause an alteration in the contour and appearance of the corresponding ureteric orifice. Thus:

A. Dilatation of the renal pelvis by a calculus obstructing the outlet is sometimes accompanied by an apparent elongation of the corresponding ureteric orifice and by a congestion of its lips.

B. Calculous pyelitis of the alkaline type produces a characteristic scald-like erosion and blush of the ureteric orifice, a condition which may subsequently give place to cicatricial warping of the opening.

C. Entire cessation of the life of a kidney affected by calculous pyelitis is marked by "holing" of the orifice and a ureteric efflux of solid or semi-solid pus.

These three changes in the appearance of the orifice and in its efflux seem to me to be of so much importance in operative interference upon the kidney and in the diagnostic prognosis of the renal condition, that I venture to remark upon them in detail.

* I say *possibly*, for it is not by any means contended that the ureteric orifice *always* changes when a stone forms in the corresponding kidney. It is merely stated that such does occur in a fair proportion of cases, and that this proportion is large enough to warrant the cystoscopic examination, and the inferential suspicion that stone is present if such changes are found with other clinical symptoms of the disorder.

Instances in which no orificial changes existed.

1. (Miss E—, vol. v, 91.)—I removed a large branched aseptic phosphatic calculus from the left kidney. There was no pyelitis; neither ureteric orifice was abnormal.

2. (Mr. L—, vol. v, 94.)—An adherent oxalate in left pelvis; no ureteric change.

3. (Rev. P. E—, vol. v, 360.)—A soft, small, whitish oxalate in pelvis; no change.

A

B

C

Figs. B and C.—Lime oxalate stone projecting from ureteric orifice. Seen sideways and from in front.

Bale & Danielsson, Ltd., Lith.

A. **Dilatation of the Pelvis of the Kidney by Stone may produce an Apparent Elongation in the Ureteric Orifice by causing Venous Congestion of the Lips** (cf. p. 22).

Cystoscopy.—The urine can generally be cleared by Contrexeville or Kronenquelle water, and the bladder, with the exception of a marked injection of the trigonal and post-trigonal vessels, will appear healthy.*

On contrasting the two ureteric orifices it will be noticed that the one which corresponds to the affected kidney appears elongated ; the opening is no longer a tiny slit, but a furrow. The lips have not the slight pink blush of health, but are of a colour duller and darker than that marking the buccal mucous membrane. They are, moreover, swollen (Plate IX, fig. A). The novice might conclude that this condition represents a dilated ureteric orifice, and argue therefrom that the entire ureter corresponds in size and colour-change to the opening. This is not so. If an ordinary ureteric catheter is passed into such a ureteric orifice through an open tube by Kelly's method, it will fit the orifice snugly, and demonstrate that the lips alone are changed by congestion, and that the vesical part of the ureter is not dilated. This is, of course, presuming that no calculus has travelled along the tube.† Moreover, if in a case of elongated ureteric orifice the ureter be exposed in the loin, lightly stripped of its fat, and examined by means of a strong head-lamp, but little change from its normal size, colour, or shape will be detected.

The rule is this: the lips of the ureteric orifice become passively congested and swollen with some interference of

* In three or four of my cases that curious and rare adenoid-like appearance was met with. I have previously remarked upon this condition, and surmised that it may be evoked by irritation of the urine, but it is neither characteristic nor common.

† If a calculus has travelled along the tube the orifice may be stretched, and very frequently looks larger.

the ureteric venous supply.* Hence the *apparent* elongation of the orifice itself.

The extent to which the furrow of the orifice is elongated is no index to the degree of dilatation of the renal pelvis. That is to say, a very elongated orifice does not necessarily indicate marked hydronephrosis or hydroureter.

It will be observed there is no assumption of diagnosis here as to *the cause* of the dilatation of the renal pelvis, for this condition of the orifice is seen in various obstructive diseases of the ureter, bladder, and urethra. The presence of calculus must be established on clinical and radiographic grounds, but it gives us a clue to the side on which trouble exists if the stone be latent, and an idea of the commencing dilatation of the pelvis if stone is known to be there.

If, now, renal pain suggestive of calculus be complained of, and a marked elongation of the ureteric orifice be noted on the same side, we have good reason to advise renal exploration, even though the urine be clear and other symptoms of stone be absent, for dilatation of the pelvis is usually the first step in the series of destructive changes which are set up by the presence of stone in the renal pelvis. It should therefore be a distinct indication (prophylactic) for the removal of the offending body.

The following obscure case was under the care of Mr. Gilford, of Reading, to whom I am indebted for a very accurate history:

A little boy, R. M—, æt. 7½, with a family history of phthisis—the mother had been operated on for a tuberculous tumour of the breast (Targett), and an uncle had recently died of joint tuberculosis—began to pass blood with his urine. On two or three occasions the blood was sufficient in quantity to give a reddish

* Where the exact interruption is I cannot say. It may be in the course of the ureter, and often is so, I believe, in females, but as it most frequently accompanies disease or dilatation of the renal pelvis, I look upon the congestion as analogous in its multi-causation to rectal piles.

colour to the urine, but as a rule it was scanty, and could only be detected by aid of the microscope. No other symptom was noticed. Gradually, quantities of granular *débris* mixed with pus and blood appeared in the secretion. and tubercle bacilli were reported to have been found. On these grounds, and because of his wasted appearance and his family history, the case was suspected to be

FIG. 32.

Skiagram of stones removed from patient E. L—. Note varying densities.

tuberculosis, but no subjective symptom enabled the disease to be located. The diagnosis of tuberculosis was confirmed by a well-known hospital physician in London.

After eighteen months I was asked to cystoscope the bladder in order to ascertain the source of the symptomless pyuria. I found the bladder healthy and free from tubercle. The right ureteric

orifice was elongated and congested; no efflux was noticed. The left was healthy. I diagnosed latent stone in the right kidney. Radiography showed four stones in the right kidney (Plate X). I removed four (Fig. 32). The kidney was free from tubercle. It was hollowed, and the pelvis was dilated. The point of the largest stone had dropped like a nose on to the pelvic orifice of the ureter, and had induced dilatation. The boy recovered, and has been well since.

Now there was nothing in this case to locate the kidney as the cause of the pyuria except the cystoscope.

It might be argued that the radiography demonstrated the stones. True, but radiography is not yet infallible. Here is a case in point:

G. K—, a boy æt. 12, a patient sent by Dr. MacMunn, had been noticed to be passing puriform urine painlessly. No evidence could be obtained of the source of the pus. He was sent to me for diagnosis. No tubercle could be found in the urine. Two radiographs of the kidney were taken but without result, and yet the boy was thin, and apparently a capital subject for the X ray.

On cystoscopy I saw the left ureteric orifice was decidedly abnormal; it was more open than natural. The lips formed an oval which was bridged by a central adhesion. There was no efflux, but pressure on the loin caused the orifice to gape. The left ureteric area of the bladder was distinctly granular and spongy. The other ureteric orifice was healthy, and so was the rest of the bladder. Although the left renal region was not tender, and no tumour could be discovered, yet, relying on the cystoscopy, I cut on to the left kidney and found the pelvis dilated, the kidney much atrophied, and an adherent, smooth oxalate stone, the size of a big cherry-stone, lay at the pelvic orifice of the ureter. The boy recovered.

B. **Chronic Calculous Pyelitis (of the Neutral or Alkaline Type) produces a Swelling and a Scald-like Erosion of the Ureteric Lips, and a Reddening of the Immediate Area around.**

The stage in which the imprisoned calculus induces alkaline pyelitis is generally characterised by marked changes in the orifice of the corresponding ureter, changes which are manifestly due to the passage over them of caustic puriform urine. This alteration is some index to

Skiagram of stones in the kidney of a boy. Removal and recovery.

Engraved and printed by Bale & Danielsson, Ltd.

the grade of the inflammatory changes in upper parts of the urinary tract (the pelvis and calyces).

The cystoscopy of cases taken in increasing grades of severity is as follows :

(*a*) *A Mild Grade.*—On washing out the bladder thoroughly—for these cases need very thorough cleansing *—the mucous membrane will be seen to be healthy over the greater part of the viscus. But the eye will at once be arrested by the appearance of the ureteric orifice of the affected kidney. It is no longer a dull, darkly congested, elongated furrow; the orifice is rounder, the lips are redder and a little everted, and the epithelium covering them is distinctly absent. The surrounding area looks rough, even warty. The ureteric efflux is muddy, the jets being forcible and rapidly repeated, so that the medium near the orifice becomes quickly obscured. In other words, the ureteric orifice shows the effects of the first stage of an irritating pyelitis, and the rapidly repeated efflux denotes that the greater part of the kidney is healthy and hyperactive.

On turning to the opposite ureteric orifice the contrast is striking. The lips are a little swollen, it is true, but this is due to their participating in the swelling of the adjacent trigone. They are of normal colour, and the efflux, *if seen*, is glycerine-like in its colour, steady in its prolonged ejectment, and repeated only at long intervals; in other words, this, the healthy kidney, is for the nonce lethargic, and the irritated kidney is performing the greater part of the body-work.

On turning the prism so as to face the base of such a case it will be seen that its colour is like that of our tongue or the inside of the mouth. The surface is distinctly lumpy, even hillocky; it may, in women, be overlaid with

* Contrexeville water and rest will clear the urine absolutely, making the secretion white and bright, but it will not clear the surface of the bladder. This will always be found to be covered with muco-pus or phosphates. It is nearly always best to wash freely, and when the examination is complete to introduce weak silver nitrate solution (gr. 1 to O½).

an exceedingly thin layer of mucus, like candle-wax. The urethral orifice of the bladder is swollen, gelatinous, and translucent.

All these basal changes point to the irritation of pyelitic urine diffused over the lowest area of the bladder, not concentrated, as it is upon the lips of the affected ureteric orifice. The cystoscopist will find these changes are often related, clinically, to bladder irritability and scalding on urination.

Mr. H—, æt. 40, sent by Mr. Braine. Maternal history of phthisis. Patient has had fixed pain in left kidney for twelve years. He has had exacerbations four times a year, but is not sick with the attack. Lying on the left side relieves absolutely; cannot lie on right. No frequency of urination; no pain in connection with micturition.

Urine 1014, pyelitic, acid. A left renal swelling detected in left loin.

Cystoscopy.—Left ureteric orifice large, lips much swollen; orifice a crenated hole, lower edge slightly ulcerated. From this opening an occasional stream of puriform urine issues. Base of bladder and right ureteric orifice a little swollen.

Diagnosis.—Dilated left renal pelvis. Left pyelitis. Incarcerated calculus in left kidney.

Operation.—The left kidney was large. It was sacculated and contained much pus, and in the pelvis was a large, fixed, branched stone. It was removed. The patient healed, and reported later on as well.

I may here digress in order to add that in one case of nephropexy I unwittingly induced all these appearances by setting up a descending ureteritis.

A girl, æt. 20, was brought to me with a tender movable left kidney. I stitched it up with two catgut strands in the usual way. The patient passed blood during her convalescence, and complained of much kidney pain. I sent her to the sea-side, but she returned passing pus, blood, and phosphatic material in her urine, and complaining of much bladder distress.

I examined with the cystoscope, and saw the left ureteric orifice buried in a pink gelatinous mound of œdematous mucous membrane. The surface of this mound was superficially eroded, and from the orifice hung a thick tape of muco-pus. Behind this again,

on the bladder wall, was a distinctly ulcerated surface the size of a lentil. Was this a stone descending, or was it pyelitis? I cut down upon the kidney and found that one of my ligatures (catgut), which I had used to anchor the kidney, had been inadvertently passed through one of the lower calyces of the kidney. The irritation of this non-absorbed ligature had induced descending pyelitis. I cut the strand and pulled it out. Nothing more was done. All the symptoms of bladder distress and of renal pain disappeared, and the urine became normal.

(*b*) *A Severer Grade.*—As the grade of the pyelitis increases in severity the secretion of the kidney diminishes; it becomes more alkaline or even septic, and of a fishy smell, and the ureteric orifice suffers more acutely in consequence.

The ureteric lips thicken, become more eroded, or ulcerated. They may even be rolled out by ureteric spasm, and resemble in miniature the everted anus of a horse during defæcation. A slow trickle or a small forceless stream of muddy urine issues sluggishly from the orifice, an effort which may not be repeated for many seconds, but the opposite kidney is now active, and repeated streams of glycerine-like urine issue from the opposite healthy ureteric mouth.

That part of the interureteric bar upon which the diseased ureteric orifice opens becomes upraised (? hypertrophy from repeated spasmodic efforts). The mucous membrane covering it is patched with small deep red extravasations, or the whole ureteric area may acquire the aspect of eczema rubrum.

In a few instances small grape-like bodies (distended glands) appear in clumps in front and at the side of the orifice. This condition, I believe, serves to indicate the extent to which the pyelo-nephritis has crippled the renal tissue.

The trigone is more congested, more swollen, and more gelatinous than in the milder grade.

Mrs. X. L—, a patient of Mr. H. R. Townsend and Dr. P, T. Cremen, of Cork. In September, 1900, this lady had a sudden

and apparently causeless attack of fever, accompanied by pain inside the anterior superior iliac spine of the right side, and pus appeared in the urine. It subsided, but she had rigors at Christmas, accompanied by pain and difficulty in urination. A succession of rises of temperature ensued, each rise being heralded by the urine becoming clear, the temperature falling when pus reappeared.

The irritability of the bladder varied with the pus, being most marked when the pus was abundant. Urine, sp. gr. 1006.

It was elicited in cross-examination that she had suffered from pain in the right loin and over the appendix twelve years ago, but latterly had not noticed any pain in these regions. No tenderness or swelling found on palpating right renal area. The diagnosis I received was "calculous pyelitis."

Cystoscopy.—Greater part of bladder healthy. The orifice of right ureter elongated and lips swollen. Lower lip so denuded of epithelium as almost to amount to an ulcer. A forceless tricklet of muddy urine issued from orifice. Right limb of interureteric bar thickened. Right ureteric area patched with extravasations. The left ureteric orifice healthy and small, although the lips were a little puffy, participating in the swelling of the base. Trigone and urethral orifice much reddened and swollen.

Diagnosis given.—1. Dilated pelvis. 2. Stone in inflamed right renal pelvis. Descending puriform urine eroding lower lip of right ureteric orifice, causing hypertrophy (?) of bar and patched extravasation of ureteric area. 3. Right kidney secreting indifferently.

Operation.—Fatty capsule of kidney very adherent. Kidney white in parts; pelvis dilated. A pure oxalate of lime stone of a triangular shape filled the pelvic cavity, and the projecting nose occupied the pelvic orifice of the ureter. Patient recovered.

I was asked by a colleague to cystoscope a thin, cadaverous-looking male patient, æt. 45. A large tumour was felt in the left renal region. There was much frequency of micturition, the act being accompanied by pain. No genital tubercle.

There was a history that he had had intermittent hæmaturia from boy to manhood. Urine neutral or alkaline, 1018—1020. Pus, no tubercle bacilli.

Cystoscopy.—Bladder dark (light-absorption due to epithelial change). Left ureteric orifice everted like a horse's anus. The everted mucous membrane was ulcerated. Patched extravasation in left ureteric area. Small cyst-like bodies singly and in groups to the outer side of orifice. Right ureteric orifice healthy.

Operation.—Mr. Openshaw cut into the kidney, which was a thin-walled sac. A quarry of rough phosphatic stones found and removed. One large black eroded stone lay in the pelvis over the pelvic mouth of the ureter. Patient recovered.

(*c*) *The Severest Grade.*—As time progresses the grade of the pyelitis becomes increasingly severe, and the severest form finds, I believe, its best illustration in women, and especially in those who have a family history of tuberculosis. The irritative action of the descending acrid puriform urine is no longer confined to the ureteric orifice of the stone-bearing kidney; it affects the entire bladder. The coats of the viscus become deeply inflamed, they then thicken, and finally contract. The capacity is therefore ultimately much diminished, and though the stone may be removed from the kidney, and even the kidney excised, yet the recovery of the bladder is tardy and sometimes never attained.

Cystoscopy.—The lips of the affected ureteric orifice are dark red and ulcerated. The orifice is wide and gaping, the area around much reddened and swollen; the mucous membrane of the entire bladder is, moreover, so altered as to assume the appearance of chronic contracting cystitis, marked by recurrent attacks of acute inflammation.

The efflux from the diseased ureter is slow, forceless, and thick; it is white, even yellowish in colour.

Mrs. P—, æt. 32, came under my care at St. Peter's Hospital, suffering from extreme pain and irritability of the bladder. Her history was as follows:

From childhood until three years ago she has had occasional severe pain in her right loin. This pain came on suddenly, lasted a few hours, and was accompanied by vomiting. There was never any hæmaturia.

Three years ago the urine became thick (pus), and the pain in the right kidney subsided, and has since nearly disappeared.

Her chief complaint now is that day and night she has to pass urine every twenty to thirty minutes. There is much scalding, great difficulty and straining in the act. Urine 1010, acid. No casts, no tubercle bacilli, but pus. There is a family history of phthisis and kidney disease.

Cystoscopy.—The right ureteric orifice was widely open, and I could have thrust a lead pencil into it, but it was smooth and non-infiltrated. The area around was much swollen and ulcerated, and of a bright red, like the peeled and peeling patches of eczema rubrum. The left ureteric orifice was also patent and "holed," half the size of the right. The trigone and the base of bladder were greatly inflamed and ulcerated in one part. The rest of the bladder was much congested and thickened, and it held with difficulty two or three ounces of medium.

Extract from notes.—"I thought there might be stone in the right kidney, but that it was much diseased as well, also that the left kidney had commenced to give way, and I did not therefore care to interfere if I could not nephrectomise. I was much biassed by the family history of tuberculosis."

She was much improved by her stay in the hospital, and the pus diminished greatly. Feeling sure I had erred, I kept in touch with the patient through the courtesy of her doctor, Mr. Garneys Wales of Downham Market. He had always expressed his belief that stone existed, and that something might be done to relieve the patient.

After two years she came temporarily under the care of Dr. Powell, of Brighton, who X-rayed her, and said the right kidney could be operated on. The patient returned to me. Her sufferings were extreme. Every few minutes she strained to relieve herself of urine, every act being accompanied by severe meatal and perinæal pain. On examining with the cystoscope I found the ureteric orifice had exactly the same appearance as when seen two years ago, but I now recognised in it a condition which I had since become familiar with, as typical of severe calculous pyelitis with consecutive ulcerative cystitis. I therefore performed nephrolithotomy in the hopes that the removal of the stone would cure the bladder pain.

I removed a large branched uric acid calculus from the right kidney. The wound in the loin quickly healed, but her symptoms were not much ameliorated. The right ureteric orifice was round and patulous, but pus oozed from it in plugs. I therefore performed right nephrectomy, after satisfying myself that only pus came from the right renal pelvis. Even this did not cure her, though her pain was certainly abated, but it will be seen from her letter lately received that her sufferings are still great. "Sharp pain is decidedly better, but the frequency is no better yet. I cannot retain my urine any longer than a quarter of an hour, and then I have a lot of that smarting and burning pain while passing urine. . . . When I get a bit tired this other kidney aches a good bit, otherwise I feel better

in my general health, and keep about all day, but I do only very light work. If I could but get the bladder stronger and the frequency better, I could bear the pain, as it's not nearly so intense as it used to be, but the frequency is just as bad at night as during the day, and so I get no proper rest with it."

Clinical.—The severer forms of calculous pyelitis are, I believe, always accompanied by bladder suffering, the acuteness of which will depend on the duration and grade of the pyelitis, but the essential cause lies in the condition of the vesical orifice of the ureter. In the severer forms marked frequency of micturition (diurnal and nocturnal) will be complained of, and scalding and pain will be experienced in the urethra during and after the act. The actual suffering varies according to the decomposition of the urine. In rare instances women suffer pain at the upper part of corresponding buttock. Blood is only seen after exercise or severe exertion, and this will emanate from the kidney.

It is interesting to note that the vesical irritability is affected in some cases of ulcerated ureteric orifice by posture in sleep. If the patient lies on the *affected* side, the irritability of the bladder at night is much more marked. In fact, I look upon this sign as characteristic of an ulcerated orifice, or a rawness in the circumureteric area, uterine affections having been eliminated.

It is also noticeable that as the pyelitis increases, and the bladder symptoms become more pronounced, the renal pain, which has been so long a feature of the case, subsides, and may even be *forgotten*. This latter fact is very misleading, for a practitioner summoned to the case in what may be termed the bladder stage, has his attention more especially drawn to the vesical distress, and neglects to ask for a history of loin pain.

One word as regards sex. Women undoubtedly suffer more frequently and more severely from large renal calculi. Some compensation, however, lies in the fact that they are more easily and surely radiographed, and much more easily operated upon, for renal surgery in

women hardly ever presents any operative difficulty worth the mention.

An Especial Difficulty.—An especial difficulty occurs in women in deciding between advanced calculous pyelitis and *very chronic* reno-vesical tuberculosis.

There is much similarity between the clinical symptoms and cystoscopic features of these diseases. Both cause diurnal and nocturnal bladder distress. In both there may be renal swelling and evening temperature. Both affect the ureteric orifice and surrounding bladder surface in much the same way.

There are a few points which may serve, however, to distinguish them. There is usually a long history (years) of renal pain with renal calculus and years of pus-free urine, and the bladder distress usually comes on after the appearance of the pus in the urine. The renal pain in tuberculosis is of shorter duration (one to two years), the bladder being implicated early. The urine is nearly always puriform in tuberculosis from the onset, and frequently tubercle bacilli are discovered in it. Unfortunately the bacteriological research may be negative in tubercle and radiography negative in stone, so that it is important to attempt a cystoscopic differentiation.

The cystoscopic points which I rely upon are the following:—The ureteric orifice in calculous pyelitis is not a thick-edged, sharply cut hole as in tubercle. I have never seen it dragged out of its position in the trigone, as in tubercle. Both ureteric orifices are never patched in calculous pyelitis with extravasations as they are in tubercle. The entire surface of the bladder in calculous pyelitis never shows the extensive red-edged surface ulcerations with healthy white intervening areas, nor the pinched-up, rose-red, granulation-covered patches, as it does in tubercle. I allude to this subject later, page 160.

In men with genital evidence of tuberculosis present, of course, an easy differential diagnosis is to hand.

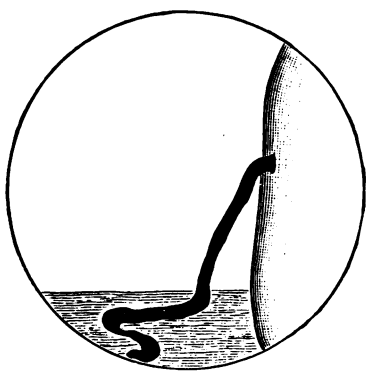
c. The Kidney becomes functionally Useless, the Stone being still imprisoned.

Sooner or later the pyelitic inflammation invades the parenchyma of the gland, and pyramid after pyramid becomes useless.

If the ureteric channel remains open the kidney becomes fixed, it is retracted upwards, and, in course of time, ceases its secretory work. Not infrequently the pain subsides in the kidney as *the organ becomes fixed.* Pain may even be unmentioned by the patient unless it is elicited by cross-examination, but the pus or muco-pus still appears in the urine.

On cystoscopy, the bladder having been thoroughly

FIG. 33.



Cystoscopic diagram of a "pipe" of soft putty-like pus being pressed from left ureter.

cleansed, one ureter will at once strike the observer as being abnormal. It is no longer a slit or a furrow, but a small round hole. The edge is not inflamed, it is sharply defined. Suddenly there will be seen to issue from it a flat, white tape of pus. This will come out quite slowly; it will slide down the slight incline, and coil on the post-trigonal area just like treacle dropped from a spoon (Fig. 33), or the pus may be stiffer in consistence. It will then issue solid, like a macaroni stick appears as it is

forced through the perforation of the macaroni machine. This will project for a certain length and then quietly break off; the segment will now slide down on to the bladder base to be replaced by another extruded length. The efflux soon ceases, and may not be repeated for a short time. Should the cystoscopist note the hole-like opening it should receive his patient scrutiny, for the pus may not then be issuing. The semi-solid or solid pus denotes that there is no urine, but that the pus, being secreted in the pelvis, is being forced along the ureter by the contraction of the tube. It is an indication that probably nothing short of *nephrectomy* will suffice, for the gland, if it be inflamed and functionless, is of no use to the patient, but is, in reality, a source of danger.

The macaroni efflux is not diagnostic of stone; it is merely an indication of old pyelitis with a functionless kidney, but it has an important bearing on operative procedure, for if the stone *only* is removed the suppurative pyelitis will continue, the loin sinus will close and open repeatedly, or remain discharging pus freely. In either case a nephrectomy will have to be carried out subsequently. What is needed, and that urgently, is a visual test of a functionless kidney. Can no method of staining be adopted whereby we can tell a functionless kidney when it is cut into? I am sure some at least, if not many, of the cases of long-continued calculous pyelitis in which we encounter thick, *large*, and hard kidneys which have harboured fixed, branched pelvic stones for many years are quite deficient of all renal power. The interstitial tissue is well nourished; they bleed on section; they inflame, and they give rise to severe pain when inflamed, but they are useless. It might be contended that the ureter catheter affords the best evidence of an active kidney, but I have found this method of research misleading.

Illustrations of Solid Pus Effluxes.

H. B. H—, æt. 60, was brought to me in 1897 by Mr. Stormont Murray. For twenty-two years patient had had pyuria of an

uncertain cause. Latterly he had been liable to recurrent attacks of fever with rigors. The history I obtained was—

In 1871 attacks of left renal colic.

In 1873 passed a left renal uratic calculus, but pain continued in left kidney.

In 1875 pyuria.

In 1878 a prostatic abscess was opened by the late Mr. John Wood, and the resultant perineal sinus leaked for ten years.

In 1881 pain ceased entirely in left kidney; no further symptoms except constant pyuria, no bladder irritability except with the fevers.

I was quite unable to say where the pus came from—whether from an old prostatic abscess sac or left-sided pyelitis.

I attempted to cystoscope, but met with difficulty at the prostate and desisted. Repeated rigors ensued. The left kidney suddenly became intensely painful and swollen. His general condition rapidly deteriorated. I cystoscoped again, and saw a small round open left ureter with solid pus issuing from it. I cut down upon the left kidney, found it hard and embedded in dense adhesions and tough fat, opened an abscess in the cortex, found a fixed pelvic stone and removed it. The pyuria at once lessened, but the loin sinus closed and reopened; feverish attacks ensued, and I nephrectomised with considerable difficulty. He healed, and is now in perfect health.

Case 2.—W. S—, æt. 53, was sent to me by Surgeon-Major John Smythe, of Mysore, with the following note:—"Mr. S— has suffered for five years from pyuria, and has been treated to death for cystitis. I came to be in charge of him recently, and finding the so-called cystitis painless and, indeed, presenting none of the symptoms of genuine cystitis, I examined him with the cystoscope, and saw the pus issuing from the left ureter and nothing coming from the right. The left kidney is, I think, slightly enlarged. In addition to the pyuria there is hæmaturia on exertion, such as after a game of rackets or a ten-mile walk. What the cause of the symptomless pyelitis is remains to be seen. I suggest stone. He has been twice radiographed negatively. I think the left kidney should be explored."

I ascertained that the patient had been operated on for stricture five years previously when on a visit to Ireland—that he could pass No. 12 E, that the pyuria was symptomless, but that there was a history of an occasional but slight pain lately in the left side; that he had slept latterly on the left side to ease the pain.

On cystoscopy the left ureteric orifice was tumid, prolapsed, and widely dilated. After watching it some seconds a continuous defæcation of a thick round column of white pus took place very slowly. The rest of the bladder was healthy, the right ureteric orifice but small and red.

On exploring the left kidney the perirenal fat was found much adherent, an abscess was opened in the cortex of the tail, and an irregular-shaped stone embedded at the end of a calyx in the tail was removed. I drained. The wound healed to a sinus, whence day by day for months thick pus issued, but no urine. I therefore removed the kidney. He has since been in perfect health.

An Especial Fallacy.—The cystoscopist must locate the ureteric ridge, and satisfy himself that he is watching the *ureteric orifice*, and not a sinus opening into the bladder. In women perivesical abscesses in connection with the ovary or other pelvic viscera occasionally burst into the bladder by small openings, and thick pus is extruded in a macaroni or telegraph tape condition from the mouth of the sinus, exactly in the same way as that issuing from the ureteric orifice of a functionless kidney, the subject of chronic calculous pyelo-nephritis. *The cystoscopic difference is luckily well marked* when the kidney has become functionless, the wave of acid urine has ceased, the pus is often unirritating, and the circumureteric area is therefore comparatively flat, smooth, and healthy, only the orifice is rounded and patulous; but in those cases in which an abscess outside the bladder bursts into it the mucous membrane around the sinus is remarkable. It forms large, gelatinous, purple folds. These "fixed," congested, and œdematous rugæ are the result of the proximity of the extra-vesical inflammation. Between two of the most prominent rugæ the tape of pus issues. These artificial openings are mostly away from the ureteric area, being at the sides low down.

CHAPTER VII.

THE ASPECT OF THE ORIFICE OF A URETER ALONG WHICH A STONE IS SLOWLY DESCENDING.

MANY interesting clinical features are associated with the history of a small descending stone. As a student one is apt to consider that once a stone has started on the downward path it completes its journey quickly, often within a week or so. Increased clinical, cystoscopic, and X-ray experience demonstrates that many stones take months before they finally issue from the ureteric orifice into the bladder; that during this time the pain is not continuous in the kidney; as often as not the renal pain is only in the form of colics or "kidney attacks;" that when it has reached the lower third a fixed pain above Poupart's ligament is experienced which may be mistaken for quite a variety of diseases—appendical or ovarian, or even hernial trouble; and that, when it has entered the lower two inches of the ureter it may elicit all the clinical symptoms of stone in the bladder. Lastly, in many cases a cystoscopic examination may reveal the probable cause of the pain to be a stone which is too small to cast a shadow with the X rays.

My attention was drawn very forcibly to this subject by a mistake I made some years ago in cystoscopic diagnosis. I had inferred that a certain appearance was always associated with descending tuberculosis and not stone. The case, though prolix, is well worth quoting in detail. It will also serve to introduce the subject.

A. L—, æt. 24—no venereal—came to me in 1891 complaining of slight pain in the right lumbar region, which continued until conclusion of case.

1892.—Pain extended to right groin and right testis.

1893, October.—Bloody urine for three days. No clots. Lumbar pain more marked.

1894, March.—A similar attack of hæmaturia without reference to exercise.

June.—More blood in urine and pain in penis towards glans.

August.—Pain in right side easier, but more pain in penis towards glans as the act of micturition is completed. He notes "that the urine is spasmodically shut off by the pain."

September.—Free from pain in right side, but a little stitch-like pain in groin. He urinates every hour in the day and twice at night. The stream is often suddenly stopped by the pain in the urethra. He has then to leave off and button up, as experience has taught him it is useless to strain (reflex stammer of compressor urethræ). Urine 1020, clear, only a few pus flakes. No tubercle bacilli; no crystals.

1894, November.—Cystoscopy. Some spasm in deep urethra on introducing instrument. Bladder free. No stone. Orifice of right ureter healthy; lips a little swollen; a number of punctiform bright hæmorrhages are in the immediate neighbourhood of the orifice. No bright ecchymosis.

Diagnosis uncertain. Mother died of tuberculosis, and the irritability of bladder is suspicious of that disease.

Exploration of right kidney: organ not opened. It appeared perfectly healthy. Operation gave complete relief from renal pain, but still pain at end of penis after urination.

1894, December.—Suddenly something gave way in belly, and immediately a better stream resulted. Penile pain, which was intense just before this happened, now subsided, and the irritability of bladder at night diminished.

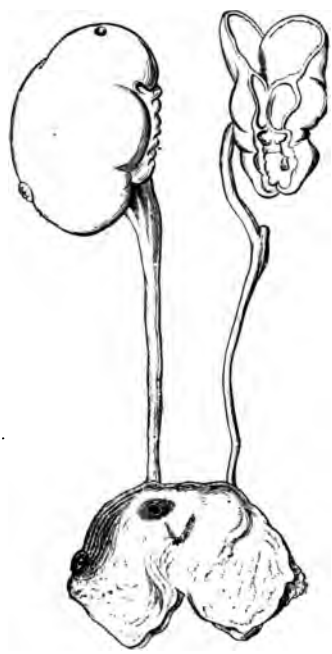
I cystoscoped again to discover the cause for the amelioration of the reflex symptoms, and the reasons for the spasmodic arrest of stream, the narrowness of stream, and for the vesical irritability. I saw a small crystalline renal calculus which had evidently just entered the bladder from the ureter, for the crystals were blood-stained, and there was none of that white lime powder on the surface which so quickly forms once a crystalline renal calculus is exposed to the bladder urine. I crushed and evacuated it. From other cases I now knew that the "giving way" feeling in the belly is often the shifting of a stone in the ureter.

From this case I learned a variety of useful lessons.

First, that descending stone, when very near the

ureteric orifice, may cause petechial hæmorrhages around that opening; secondly, that when this condition is seen other clinical symptoms accompany it, such as (1) frequency of urination, (2) penile pain after the act, (3) spasmodic obstruction to the flow, and (4) some spasmodic, deep urethral obstruction to the passage of an instrument; and that these symptoms are mainly reflex, for they disappear

FIG. 34.



Bloody discoloration of the ureteric orifice induced by block in lower ureter. (Dickinson.)

directly the stone passes into the bladder, or even, as it sometimes appears, when it shifts its position in the lower ureter.

On searching the volumes of the Pathological Society for any corroborative hint of this condition, I came across the following instructive and convincing case related by

Dr. Bagshaw,* and more fully dealt with by Dr. Dickinson † in his invaluable treatise on urinary disease.

A man æt. 62 was seized with suppression of urine, which was proved on post-mortem to be due to blockage of the right ureter, the left kidney having been atrophic and useless for years.

"The infundibula, pelvis, and ureter of the right side were dilated, and contained some urine. The bladder, when laid open, was found empty, and the *orifice of the right ureter was found to be entirely blocked up by a dark-coloured plug*, slightly rough to the touch, but not hard, being partly broken down by pressure between the fingers.

"*Under the mucous membrane of the bladder, surrounding the orifice of the ureter, there was a sanguineous discoloration*, and in another part of the bladder enough blood had been extravasated to form a clot the size of a bean" (Fig. 34).

This case proved to me that any acute distension of the ureteric canal near the bladder can discolour the orifice and its surroundings. I had previously noticed in cases of carcinoma of the kidney, after the passage of large clots, accompanied by renal pain and colic, that petechial extravasation took place around the ureteric orifice, but did not understand the cause.

The following notes of the cystoscopy of descending calculi have been gathered from cases examined during the last six years, so that I can safely say that no visual error or mistake in technique has stultified the observations.

Cystoscopy of the visual appearances of the ureteric orifice which may be caused by a stone slowly traversing the lower third of the ureter.

It will be noticed that I expressly say that changes *may* occur in the contour and appearance of the ureteric orifice *when* the stone *has advanced to near the vesical end*

* 'Path. Trans.,' vol. xvi, 1865, p. 176.

† A fuller account may be found in Dickinson's 'Treatise on Renal Affections,' vol. iii, p. 965. I am indebted to Dr. Dickinson for permission to use the figure (Fig. 34).

of the ureter. My reasons for laying stress on this are that I have occasionally seen no change in the ureteric orifice.* I have no evidence of any change taking place when stones have been arrested in the upper or middle third of the ureter. Further visual experience may show that stones higher up the ureter affect the appearance of the orifice.

The appearance of stone at the vesical orifice of the ureter is heralded by the appearance of bright red punctiform extravasations in the immediate neighbourhood of that opening; moreover that side of the interureteric bar becomes thick and swollen. The mucous membrane then changes until it assumes a dull red velvety appearance speckled with fine brighter red spots, the entire surface reminding one of a patch of subacute gonorrhœal urethritis. Finally the orifice and the area immediately around it becomes of a uniform red from extravasated blood, and thus forms "a bruised ureteric orifice."

The rougher and more spiculated the stone, or the larger the stone, the more marked the extravasation. Perhaps to combine these two, "the greater the difficulty of transit, so much the more marked the extravasation around the orifice."

The following cases will illustrate these statements up to this point:

The late Dr. Leach asked me to cystoscope a gentleman æt. 36. In 1888 the patient had had a typical attack of right renal colic, which was so severe that opium failed to give relief. After some hours of suffering the pain suddenly left him, and he had no further trouble.

March, 1891.—Severe right renal pain, which gradually subsided. Two months later sudden severe pain, extending from point of penis to neck of bladder, coming on after passing water, and lasting several minutes. This continued for ten days; no blood,

* Mr. A— (vol. v, 403), with symptoms of right-sided descending stone; no evidence in the ureter, and yet he passed a small spiculated stone five weeks after the examination.

no frequency at first. Gradually an intense perineal pain after urination and a constant desire to urinate.

Cystoscopy (June 28th, 1891, three months after last attack of pain in side and one month after the onset of perineal pain, the renal pain having subsided).—The right ureteric orifice was large, the lips swollen. The adjacent mucous membrane was covered with six irregular hæmorrhages of a dark colour. The rest of the bladder was quite healthy and clear; no stone.

I did not understand these submucous hæmorrhages then, but I noted them.

In September, 1891, two and a half months after I had cystoscoped, he had a "dreadful attack of pain in the perineum, and passed an oxalate of lime stone, covered with sharp plates and powdered with some triple phosphate; that is, the stone took, at the lowest computation, six months to pass.

H. B—, æt. 35, sent by Dr. Thompson, of Newport, Isle of Wight. Fifteen months' right lumbar aching pain, with hæmaturia on exercise.

The right ureteric orifice a little thick-lipped and congested; petechiæ on bar in front. Passed calculus a few weeks later.

Cystoscopic Appearances (continued).—As the stone enters that final section of the ureter where the channel pierces the coats of the bladder the vascular disturbance increases, and the visual appearance changes.

A deep red uniform extravasation appears in the ureteric area, especially covering the outer limb of the trigone. This is frequently replaced by enormous œdema of the orifice, so that the ureteric orifice becomes unrecognisable, being replaced by a white mulberry-shaped mass of translucent œdema.*

Slowly the stone makes its way through this lane of œdema until its brown † nose can be seen deeply buried in a centre or side of a glistening translucent mass.

* A few months ago I had difficulty in restraining an operating surgeon, who had discovered this condition, from doing a supra-pubic cystotomy for the removal of a "polypus" of the bladder, a condition which it fairly well resembles.

† These stones, making transits of such long duration, are most frequently brown, being oxalate, and most often spiculated.

F. C—, æt. 56 (March 15th, 1902), came complaining that for three months he had had pain starting in the left inguinal region, and passing round to the left lumbar region above posterior superior spinous process of ilium. The pain comes on in attacks which last an hour or so, but he has always an ache in the left inguinal region. He has occasional frequency of urination and occasional pain at the end of the penis in passing water.

Nothing detected in the ureter or prostate by rectal examination. The urine was normal.

On cystoscopy (March 22nd, 1902) the left ureteric orifice was puffed up with œdema, so that it resembled a large wrinkled scald bleb. In the centre was a depression, and occupying this was the brownish point of a calculus.

April 22nd.—A pricking in perineum.

April 26th.—Sucked out a small irregular stone by means of the litholapaxy evacuator.

Cystoscopic Appearances (continued).—At this point the patient is generally certain, from his feelings, that the stone has dropped into his bladder, and he points to the symptoms of penile pain, frequency of urination, and difficulty in making a stream in corroboration. If the stone becomes arrested for long in the vesical section of the ureter, the œdema subsides to some extent, the puffy ureteric frill of œdema loses its white glisten, assumes a dull ruddy-brown colour, the nose of the stone becomes white from deposited phosphates, and localised cystitis appears in the immediate neighbourhood of the ureteric orifice. The bladder then assumes the appearance of subacute cystitis, but these changes are always localised to the affected ureteric area.

It would appear easy to feel the stone at this stage through the rectal wall; it depends on the size of the calculus. Personally I have found the greatest difficulty in feeling a small ureteric stone from the rectum *once it can be seen from the bladder*,—that is, when it has passed between the coats of the bladder; nor can it be detected, unless of some size, when the sound is placed in the bladder, the beak turned over and firmly held against the ureteric orifice, and the finger introduced into the rectum to make counter-pressure.

Of course, if the stone is half the size of a date stone a distinct hardness can be thus detected, but this size is rare; usually the calculus is a merely irregular collection

FIG. 35.

General size of many of the crystalline descending oxalate stones, which I have watched clinically and cystoscopically.

of sharp cutting crystals (Fig. 35), and the X ray is valueless when the concretion is so small.

The reader will note that only descending stones are now under consideration; the arrested stones are larger; they can generally be felt, whilst the X ray, used scientifically, can demonstrate them to perfection. Compare Chapter VIII on arrested stones.

Three cases will serve to illustrate more clearly this condition, but I have watched over a dozen.

Case 1.—I was asked by Dr. Tait, of Highbury, to see a patient with renal colic.

Three weeks prior to my visit he had a severe attack of right renal colic. In five days the pain in the right kidney gradually subsided, but it was replaced by pain in the penis,* especially after urination, by spasmodic interruption in the act, and by frequency.

The patient, who had passed calculi before, was certain that a

* He described it as follows :—" Suddenly in the night of the sixth day I was awakened by a stinging pain in the penis and a pressing desire to make water. From previous experience I thought I was about to pass the stone, but was disappointed. The stinging pain remained and kept me awake for an hour. The same pain recurred the next day, always when passing water, and remained for considerable but variable lengths of time after. It, in fact, lasted for sixteen days, until relieved by operation. It was modified to a great extent, I think, by medicine, and varied in proportion to the quantity I drank. The irritation was very troublesome, especially if I drank much and had to urinate frequently. The pain always appeared to run along the tip of the penis, not underneath, and was most acute towards the end. What pain I had in the kidney was only slight, and I always considered them ' after-pains ' of the severe attack of suffering which I had had in this region."

stone had entered the bladder from the right ureter, and that it had caught somewhere in the prostatic urethra. From his symptoms I felt sure it had not yet entered the bladder from the ureter, and obtained leave to cystoscope rather than to use the aspirator.

On cystoscopy, a sharply defined brown oxalate of lime calculus, in the form of a spike, could be seen protruding from the mouth of the right ureter (Pl. IX, p. 123).

The adjoining trigone was much swollen and very red. Examination by the rectum revealed nothing. Massage over the vesical ureter did not avail. I was puzzled to understand why this sharp-pointed body should retain its position so tenaciously.

I now introduced a lithotrity evacuator, passed the eye over the stone, steadied the orifice by means of a finger in the rectum, and scooped the stone, with gentle pressure from the exhausting ball, from its bed.

On examining it the reason for its arrest was obvious. It was shaped like an arrow-head, and the shaft had been presenting, so that the barb had caught in the mucous membrane of the channel and fixed the stone.

Case 2.—A man æt. 27 had had right lumbar pain for six months, pain at the end of the penis, and frequency of micturition, the latter symptom being aggravated by exercise and relieved by rest.

Cystoscopy.—Bladder healthy, except the right ureteric orifice, the mucous membrane of which protruded, tumid, gelatinous, and red, like the anus of a defæcating horse. The ring of reddened membrane was almost obscured at its inner side by a mass of clear œdema. Deeply buried towards one side could be detected the brown nose of an oxalate calculus, which could be felt rectally. Even when supra-pubic had been performed, and the finger had been introduced, it was difficult to enucleate the stone from its ureteric bed. It was the size of a flattened pea with a projecting shoulder. The shoulder must have been the obstacle to the transit.

Case 3.—A patient who asserted he had been troubled with vesical stone for twenty-eight years—he had been cut for stone four times, and had stone crushed twice—applied to me saying he had had an attack of left renal colic, and he had felt the stone pass "plumb into his bladder." This was three weeks ago. At the same time the urine suddenly stopped in the middle of urination, pain was experienced at the end of the penis at the close of the act, which took place every hour in the day but not at night.

Cystoscopy.—A crenated, thickened left ureteric orifice, no efflux. Two thick folds of mucous membrane embraced it; between these hung out a milk-white slough of surface epithelium and a piece of white phosphate of lime; no stone felt *per rectum* in the lower ureter.

Diagnosis.—Stone arrested at ureteric orifice.

In *nine months'* time a small phosphatic stone came through, and was crushed and evacuated.

Ureteric Orifice after the Transit of a Stone.—If the examination is made soon after a stone has entered the bladder after a prolonged stay in the lower ureter, marks of its having been forced through the opening are apparent, and, I may add, characteristic. But the changes vary, if I may dogmatise, upon the size and character of the surface of the stone. If it be a fair size —an orange pip is a fair size—and circular, the lip of the ureteric opening is raised into an œdematous wavy frill, the opening is large, or the edge may be eroded, irregular in shape, and even sloughy, whilst the circumureteric area is vivid red, or the surgeon may be called when the acuter stage is subsiding, and then the edge will be found everted and gelatinous like a penile meatus affected by gonorrhœa. But if a smooth stone has come through, the ureteric orifice is enlarged and open, and it looks toneless and patulous; it is not much reddened, and the former change can be noted for some weeks, but it is quickly recovered from, and often when examining a month or two after the passage of a renal calculus into the bladder I have found it impossible on mere visual grounds to say along which ureter the stone has come. Indeed, in some instances a few days after an attack of severe renal colic all signs of disturbance had vanished, and I could not honestly say on cystoscopy through which orifice the stone had come.

CHAPTER VIII.

THE CHANGES PRODUCED IN THE APPEARANCE OF THE ORIFICE OF THE URETER BY STONES PERMANENTLY ARRESTED IN THE LOWER THIRD OF THE URETER, AND THE CLINICAL FEATURES OF THE CONDITION.

I BELIEVE that there are few subjects in urinary pathology and surgery so little understood as stone impacted in the lower ureter, and yet few surgical conditions are so important, for few may prove so obscure, whilst none are able to entail such years of prolonged and apparently unrelievable suffering.

A renal calculus impacted permanently anywhere in the upper two thirds of the ureter has, it is true, a greater destructive influence upon the kidney, and can induce greater renal suffering than a stone impacted in the lower third; but such renal pain is slight, I venture to say, in comparison with that long-drawn-out agony which is caused by a stone impacted in the ureter near the bladder—for there is, in this situation, a greater tendency to periureteritis and inflammatory extension to the great pelvic plexuses.

In the last three or four years the obscurity of lower ureteric stone has been considerably diminished. Skilled radiography and expert cystoscopy have enabled surgeons to detect the arrested calculi, so that this complication will now gradually acquire clear and classical description.

The following chapter is a slight contribution to the cystoscopy of the condition, and I wish to lay particular stress on the fact that I am only now discussing stones

arrested permanently in the *lower third of the tube.* It may be because my material is insufficient that I have not, hitherto, met with orificial changes co-existing with impaction higher up.* I gather that definite changes of the mucous membrane of the orifice of the ureter ensue consequent upon the presence of a stone arrested in the ureter *near the bladder,* and that only a certain proportion of cases are thus affected.

Description of visual changes.—The changes relate to alteration in the shape of the orifice, and in the appearance of the mucous membrane lining it.

The former consists in protrusion and eversion of the mucous membrane of the ureter—prolapsed—strained out, so to speak, by the ureteric effort to rid itself of a constant source of reflex spasm—the obstructing body.

It has appeared to me that this tendency to prolapse is more marked when the surface of the stone is acicular or rough, but much stress need not be laid upon the surmise. Moreover the mucous glands, in or near the orifice, may be so distended with secretion as to resemble round or pyriform tumours of minute size. Often the appearance is like a bunch of small white currants.

In some cases (? rare) the prolapsed mucous membrane is covered with a low growth of villous processes, either in

* *General type of arrest of a stone about one inch below the kidney.*— Mrs. F—, cystoscopy, March 3rd, 1900. Left ureteric orifice healthy, pumping streams of darkish bloody urine. From the rapid recurrence and strength of the jet I anticipate a healthy kidney, without much loss of renal substance.

Operation, March 9th, 1900.—Kidney large and healthy. Large phosphatic covered stone about an inch below renal pelvis; longitudinal incision; removal. Ureter above, free from stone; rapid healing.

General type of arrest at pelvic brim.—Mrs. S—.

Cystoscopy.—Left ureteric orifice displaced a little backwards and upwards, appearing as a simple sharp-edged hole, but there is nothing characteristic: from it a decolourised blood-clot emerged with a fine tricklet of urine.

Operation.—Two stones removed from pelvic brim; cure.

the form of a tuft or in a continuous ring. From my experience of this growth I am certain it is the outcome of severe irritation; often that of oxaluria, occurring in a person disposed to warty formation of the skin.

In other cases, instead of a benign papillomatous outcrop, there is much œdema of the ruchings of the edge of the prolapse—an exudation which simulates the appearance of broad-leaved papilloma, but essentially differs from it in character, and therefore in prognosis.

To sum up: the ureteric orifice, in certain cases of rough renal stone arrested in the lower third of the ureter, will appear either as a cone of œdematous mucous membrane, the orifice being at one side, rarely near the summit, the lips of the orifice being roughened, everted, often cleft, or as an everted prolapse of red mucous membrane —a condition which is more likely to be noticed when a small stone is caught and retained fast within the orifice of the ureter. In very chronic conditions a tuft of villous processes may be seen in the prolapse or on the swollen lips of the ureteric orifice.

Type of Arrest below the Pelvic Brim, Two Inches from Bladder; with Changes (the Characteristic Type).

Fluted oxalate stone, ¼ oz. in weight, situated in lower ureter; no colics; removal through perineum.—F. H—, æt. 18, was sent to me in March, 1895, by Dr. W. G. Little, of Nelson, Lancashire. The patient complained chiefly of pain in the glans penis after micturition, and occasional pains across the back. The onset symptom seems to have been the passage of blood at the end of micturition. This was eighteen months ago. The hæmaturia had recurred off and on since. There had been no venereal disease. The stream was fair; there was no frequency. The urine was 1012 in specific gravity, and contained a trace of albumen. The trouble had been variously diagnosed, the latest opinion being tuberculosis. There was no gross evidence of this disease, and the prostate was healthy and plump.

On electric cystoscopy I discovered a prolapse of the right ureter. Crowning the everted mucous membrane was a villous papilloma.

tous tuft. It flashed across my mind that the villous papilloma played some part in the production of the prolapse, just as piles tend to evert the mucous membrane of rectum, or polypus or growth in the gut sometimes induces intussusception. I therefore did supra-pubic cystotomy, and removed the prolapse and villous growth through a small caisson. On thinking over this case the same night, it suddenly struck me that the prolapse must have been due to irritation higher up the ureteric canal, for I had noted this condition in some few cases of renal calculus. I therefore returned to the patient, and passed my finger high up into the bowel. High up in the right ureter I just felt a stone the size of a

FIG. 36.

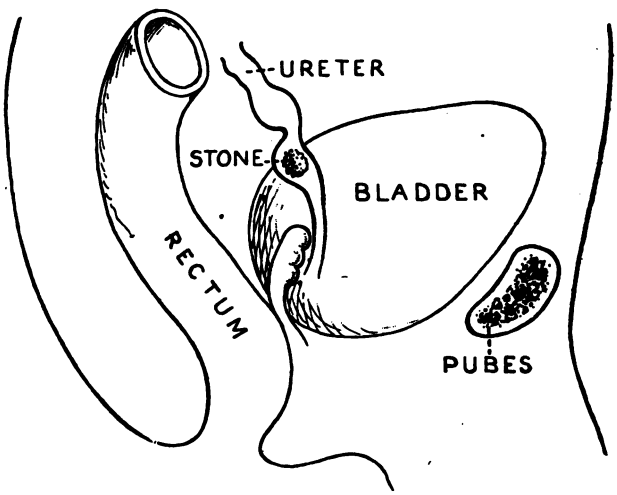


Diagram of stone in the right lower ureter of F. H—.

large marble. It had evidently become lodged in the ureter (Fig. 36), and had, as evidently, induced the prolapse of the mucous membrane at its orifice.

After the supra-pubic incision had healed, I approached the stone through a small transverse perineal incision. I had no hesitation in adopting this route, for it had been familiar to me for years in resecting pieces of vesiculæ seminales, in scooping out tubercle from the prostate, in splitting prostate capsules, in stitching vesico-rectal fistulæ, and such like operations between the gut and the bladder. With the aid of narrow, long-tongued retractors I

was able to dissect between the rectum and the lower urinary tract, every step of the route being illuminated by a forehead search-light, and by its means there was no difficulty in seeing and seizing up every bleeding vessel. I rapidly reached the ureter, being guided to it by feeling the stone in it (forced within reach of my finger by the pressure of the dresser's hand upon the abdomen). A clean incision into its long axis released a quantity of clear urine, and the stone, which weighed 2½ drachms, was removed. The latter resembled a small peach stone in size and appearance (Fig. 37). On inserting the finger into the ureter it was evident that the calculus had been lying in a dilatation of the canal, for

FIG. 37.

Oxalate stone in ureter of F. H—, half size.

the calibre was here about an inch across. I passed a thick *windowless* drain-tube up towards the kidney, and stitched its lower end into the perineal wound, providing thus for an easy route from the ureter into the perineum. The lower end was subsequently fitted to a tube dipping under carbolic lotion.

Finally I drew off 15 oz. of clear urine, specific gravity 1012, from the bladder, thus demonstrating that the bladder had not been wounded. Next day 20 oz. had drained away by the perineal tube, and 25 oz. were removed by catheter from the bladder. Specific gravity of the latter was 1015. There was an uninterrupted recovery.

Seven days after the operation I removed the uretero-perineal tube, judging that the pelvic connective tissue had banked in the drain sufficiently firmly to form an impermeable watercourse. The fistula healed rapidly. It will, perhaps, be conceded that the deep flutings on the surface of the stone did not materially obstruct the passage of the urine; any *sudden* accumulation of urine in the renal pelvis and upper ureter was thus avoided, and renal colic was therefore not evoked.*

Sequel to this case.—On January 14th, 1901, six years later, this patient returned to me suffering from "spasmodic attacks of sudden pain in the left kidney (renal colic) at intervals of three or four months. Latterly these attacks have been very severe. He always has pain in the end of his penis."

Cystoscopy.—The right ureteric orifice, from which I had clipped the prolapsed mucous membrane with its superimposed villous tuft, was a small, sharp-cut, healthy hole. My surprise may be imagined when I saw the left ureteric orifice to have assumed an appearance identical with that noticeable at the right ureteric orifice six years ago. The mucous membrane was everted, swollen, and fringed with a tuft of broad villous processes. I examined *per rectum* but could not feel any stone in the lower ureter. I did supra-pubic cystoscopy and clipped away the swollen ruchings of the papillated left ureteric orifice. I now had the pelvis X-rayed, and a shadow of a calculus was seen high up the ureter, about two and a half inches from the bladder. I therefore cut into the perineum, dissected between the prostate, bladder, vesicles, and rectum as before, and reached the left ureter. I went up as high as the white line, but could not feel the stone. I therefore did an abdominal section, and felt the stone in the ureter, just below the point of crossing the brim of the pelvis, but it was fixed by periureteric exudation. Some distance above this the ureter was the size of a child's intestine, and the left kidney felt like a thin sac. I could not push or squeeze the stone either up or down. Finally my house surgeon, Mr. Spencer, grasped it between his finger and thumb and pressed it towards my perineal wound, whilst I cut on to it blindly. I was able, by this means, after two hours' hard labour, to enucleate the stone from its ureteric bed. It was half the size of the one I had removed previously from the right ureter. It was a crystalline oxalate of lime calculus.

September, 1903.—Patient shows himself and says he is in the best of health.

* The case thus far was published in the 'Edinburgh Med. Journal,' March 1898.

Skiagram of bony pelvis of a young man, showing stones in both ureters. Operation. Death.

Engraved and printed by Bale & Danielsson, Ltd.

The following case is still more striking, for it concerns a patient with stone in both ureters low down, and crippled septic kidneys.

P. S—, æt. 21, from whom, as a little boy, I had removed by perineal section an impacted, smooth, aseptic, uric acid stone, was brought to me in 1902 with the diagnosis of stone in the bladder. His urine contained a quarter pus, and was extremely fœtid. I did not sound him, but an X-ray photograph was taken, and long stones were found in both ureters (Plate XI, *ss'*) and in the left kidney. He was suffering too acutely from pain in the left loin and bladder for me to refuse him the chance of operative relief, though the outlook was hopeless. I cystoscoped to see which ureter was the more blocked. The right ureteric orifice was patulous, the lips greatly swollen, and fringed with broad-leaved ruchings of mucous membrane like papillomata. The left ureteric orifice was open and swollen, but not fringed. I therefore cut on the left kidney, and enucleated the largest branched kidney stone I have met with; its length was six inches, and it weighed 6¼ oz. I replaced the kidney, determining to attack the ureters later. The urine passed next day was 70 oz., and on the next 100 oz., but he became uræmic, and died on the eleventh day.

Autopsy revealed an elongated stone in either ureter three inches from the bladder. Neither was fixed by periureteritis. The right ureteric stone weighed 90 grs., and was 1⅞ inches in length. The left ureteric stone was freer and smaller. It weighed 55 grs., and was 1⅜ inches in length. The right kidney was hugely dilated; the pelvis was full of pus. The left kidney shell had healed, and the pelvis was comparatively dry. Why was the right ureteric orifice so characteristic and the left less so? I think because the pyelitis was so extreme on the right.

Here is another characteristic but easier case.

F. M—, æt. 30, was sent me with an X-ray diagnosis of stone in the bladder (Plate XII). I cystoscoped because the stone was long and its axis almost vertical, so that I felt certain it was ureteric. There was no stone in the bladder, and obviously the calculus was lodged in the ureter. The cystoscope showed a very characteristic left ureteric orifice. The opening was fringed like the end of the Fallopian tube in colour and shape. I opened the peritoneal cavity over the left rectal sheath, and inserting my fingers pressed the stone up along the ureter until I had brought it above the pelvic brim. I now cut extra-peritoneally as if for tying the

iliac artery, and when the hugely dilated ureter came into view I opened it longitudinally, evacuated a quantity of clear urine, put in forceps, and pulled out a large oval oxalate of lime stone (Fig. 38).

Fig. 38.

Case of F. M—, stone in ureter; weight half an ounce (nat. size).

The ureteric incision was then stitched, and the extra-peritoneal wound closed except for a drain-tube. Finally the vertical intra-peritoneal incision was closed, and the patient made an uninterrupted recovery.

But large stones may be present in the lower ureter without inducing orificial changes.

Smooth stone, weighing ½ oz., in lower ureter; severe colics; no change in the ureteric orifice; removal of stone through the vaginal wall; cure.—Mrs. M. H—, æt. 48, was sent to me by Dr. G. Sequeira as a case of calculus. This patient enjoyed perfect health until ten years ago, when she had a severe attack of right renal colic. For seven years this recurred at long intervals, but for the last three years they have been incessant and enfeebling. Between the severe colics, which supervened every week, there was constant pain in the right loin. She was forced to sleep on the left side. Frequency of micturition was every hour, day and night; the act was painless; more urine was passed at night. Latterly bouts of excessive thirst had been experienced. On palpating the lower ureter by vaginal and rectal route, as is my routine custom in renal cases, I found a stone in the right ureter the size of a small chestnut; it was placed to the right of the uterus, but was

Skiagram of an oxalate of limestone in ureter. Removed. Cure.
(Author's case.)

Engraved and printed by Bale & Danielsson, Ltd.

freely movable. There was no prolapse of the ureteric mucous membrane into the bladder. Cutting through the right wall of the vagina I dissected towards the ureter, and fixed it and its contained stone with a very small sharp hook, which I use for supra-pubic operations. I then incised and released the stone. A large quantity of clear urine followed its removal, thus demonstrating the back pressure which had been exercised on the upper ureter and pelvis of the kidney. The stone was smooth, in size like a large nutmeg; it weighed over ½ oz. (Fig. 39). I treated this

FIG. 39.

Ureteric calculus, Mrs. M. H— (half size).

case in the same way as that of F. H—, p. 153, pushing one end of a thick windowless drain some way up the dilated ureter, and allowing the latter end to protrude from the vagina into carbolic lotion. She made a rapid recovery; no fistula followed.

Note on the Strength of the Efflux of Urine from the Ureteric Orifice in Arrested Ureteric Stone.

Does a rapid, full jet of urine from the ureteric orifice preclude the question of impaction of a stone in the ureter below the pelvic brim?

I think that a full, rapidly repeated stream is an evidence that the lower third of the ureter is free; it

does not preclude an arrest above, either at the orifice of the renal pelvis or a few inches below that point; at least, I have not yet met with a case in which a strong stream existed with a stone blocked in the lower ureter. In all cases, however, I sound the ureter with either a Kelly or a Caspar ureter catheter, and carefully examine the lower ureter bimanually and by radiography. Such a question so guardedly answered might seem unnecessary, but those who have much to do with ureteric stone will agree with me that they are often slightly pouched, and that there is in most cases ample room for the passage of urine between the stone and the ureteric wall.

It should be a rule with the operating surgeon, in all cases of apparently causeless bladder irritability or habitual retention of urine of the mid-adult, if stricture and spinal atony be excluded, to examine the lower ureter for stone by means of the cystoscope, and he should *never hesitate in such cases to insist upon skilled radiography of the lower ureters as well.*

CHAPTER IX.

THE VISUAL CHANGES WHICH TAKE PLACE IN THE URETERIC ORIFICE IN THE COURSE OF URINARY TUBERCULOSIS.

I HAVE already touched briefly upon the subject of urinary tuberculosis, and do not propose to recapitulate, except as to the manner in which the disease affects directly or indirectly the ureteric orifice. In drawing attention to the visual changes which take place in these openings under the influence of tuberculosis, I shall endeavour to prove that cystoscopy should guide the surgeon very materially in deciding upon the character and extent of any operative treatment for the eradication of renal tuberculosis. I have always maintained, if evidence of genital tubercle is to hand, in the shape of knots in the epididymis, vas, prostate, or vesicle, that the cystoscope should not be employed routinely, or if used at all it should only be passed with extreme care and gentleness; but there is a class in which no genital deposit can be found, and only renal or reno-vesical symptoms are present. It is in these cases that much obscurity of diagnosis exists, and it is in such cases that the gentle and skilled use of the instrument is advocated.

As the subject of ureteric meatoscopy in tuberculosis is not at present noticed in the literature, I do not hesitate to treat it somewhat in detail. In compiling this chapter I have at my command carefully prepared notes of over 200 unequivocal cases, but the chance of visual inaccuracy in my earlier experience with the cystoscope was very great, so that I have rejected all but the last fifty cases.

In forty-four of these, taken at all periods in the life history of the disease, I have noticed distinct changes in the ureteric orifices and their neighbourhood. These changes were described in my notes, written immediately after each examination. On collating them it was at once evident, even if the impression had not grown *pari passu* with my knowledge, that certain appearances of the orifices recur with sufficient frequency to warrant the assumption that they are characteristic guides to the position and progress of the disease.

I propose to deal with these appearances, and to add those clinical inferences which I feel certain may be logically deduced from them. Briefly enumerated the changes fall into two groups, those which may, in the present state of our knowledge, be ascribed to descending, and those to ascending changes.

The descending (from a renal source) :—(A) A golf-holed orifice. (B) A displaced orifice. (C) A choked orifice. (D) Massive œdema of the orifice.

A. *The "Golf-hole" Ureteric Orifice in Urinary Tuberculosis.*

The change most often noticeable (30 per cent.) was a peculiar "holing" of the ureteric orifice on one side. I have called it "golf holing," "rabbit holing," in my notes. When this alteration in the opening is accompanied by the evidence of tubercle in the mucous membrane of the bladder, and by the presence of tubercle bacilli in the urine, it indicates, I believe, a deposit of tubercle in the corresponding kidney.

Description of a "Holed" Ureteric Orifice in Tuberculosis (Plates I and XIII).

On looking at the ureteric orifice one notices at once that it differs in shape from the normal. The usual pink-

Changes in the Character of the Ureteric Orifice.

A narrowed, pouting, thick-lipped orifice denoting mild pyelitis.

An arched orifice denoting incipient dilatation of ureter.

A large "golf-hole" orifice in advanced destruction of kidney, such as exists in renal calculus and tuberculosis.

Bale & Danielsson, Ltd., Lith.

lipped slit or faintly coloured slipper-like orifice is replaced by a sharply cut or punched-out hole. This hole is on a level with the interureteric bar; that is to say, there are no lips visible, only the thin edge of the opening.

The size of the hole varies in different cases. It may be O or O (Plate I A). Usually the actual edge is of a whitish colour, and often smooth, but the edge near the urethra may be rough or ulcerated (Plate I B). The cystoscopist may notice that the hole is not quite in the usual place, being displaced a little to the edge of the bar (front or back). The deviation is most easily noticed in very thick succulent bars, but it is not very common. All around it there is highly reddened mucous membrane. Sometimes this is of an intense red, the colour being obviously due to submucous extravasation, and not to the surface being caked with blood or stained by it. To a practised eye the difference is at once apparent. The colour is not, I believe, any guide to the intensity of the disease.* In the florid, spongy mucous membrane around may be seen a few sparsely scattered, sharply refracting points; these are probably grey tubercle. Not infrequently there is one or more small, sharply cut, sloughy-based ulcers behind the affected ureteric orifice, and on the posterior wall or superior wall other evidences of tuberculosis will be recognised in the shape of red extravasated areas with white necrotic flakes on them, or pinched-up areas of deep red mucous membrane, or superficial erosions, or even circinate worm-eaten ulcerations.

The other ureteric orifice may be bright and healthy in contour and appearance, but often its lips are a little turgid and obviously swollen by propinquity with the in-

* Compare Case 35, page 168. May, 1899.—Cystoscopy of F—. Both ureteric orifices are reddened; areas around them are granular and inflamed; left ureteric opening looks especially involved because it is the deeper in colour. Feb., 1900.—Cystoscopy of F—. Right ureteric orifice golf-holed, a little displaced (?); left ureteric opening not noticeably changed; post-trigonal wall covered with red extravasation and superficial ulceration.

trigone. In nearly every case the capacity of the bladder will be lessened.

I have seen the other, and what should be a healthy orifice, after a prolonged course of vesical irrigation, showing the characteristic apearances of ascending septic uretero-pyelitis, the orifice being rounded, the lips swollen and pouting, and a few specks of pus mingling with the efflux. In one case—that of a lady—these points were well shown, and I declined to operate, for I was confident that the right kidney had been crippled by ascending ureteritis, and the left kidney was tuberculous, and I realised if I removed the tuberculous kidney (the left) the right would not stand the strain, and the patient would succumb to suppression of urine. A few months later the patient, a girl, suddenly developed a large right renal tumour. It almost as suddenly subsided, a large quantity of pus being passed coincidently, and she died uræmic a week later, the cystoscopic diagnosis and prognosis being thus amply justified.

The Pathological Condition of the Ureter possessing a "Golf-hole" Orifice.

What does this form of ureteric orifice denote? Does it indicate that the entire ureter is tuberculous? By no means. A "holed" ureteric orifice points to an inflamed ureter,—or, if I may put it so, to a "scalded" ureter. It is a sure sign that the wall of the ureteric tube is slightly thickened and somewhat atonic, that it will be found pale in colour and friable in texture, that the mucous membrane lining it will be found swollen but not ulcerated, and that on microscopy giant-cell systems will be probably absent. It has no reference to tuberculosis *per se*. It occurs in other cases besides tubercle (page 25). Moreover, if such a ureter is exposed to the sight and touch in the loin, the average operator would at once pronounce that ureter to be healthy. But there is evidence to show that such a ureter is not healthy, and that such a ureteric orifice is

a sign in a patient whose urine contains tubercle bacilli that a tuberculous deposit will be found in the renal parenchyma of the corresponding kidney. I repeat, there is probably a tuberculous deposit, sometimes very small, at other times quite abundant, in the renal parenchyma, and such deposit is always open to and discharges into the pelvis, and often the mucous membrane of the pelvis itself is ulcerated.

These statements are based on three operation cases which will show that the contention is sound, and therefore worth consideration, but it will be observed that in each of these three cases *marked renal pain* was present. That is to say, I did not feel at first justified in a nephrectomy, or even a renal exploration of a kidney whose ureter was merely "golf-holed," unless pain was complained of in that kidney,—unless, in fact, the localising symptom of renal pain was present to assure me that the disease was located in the kidney.

In the three cases which have been operated on the kidney was adherent at the upper or the lower pole or both. In two cases the kidney was removed within the first year of symptoms; *although the organ looked red and healthy, and although its surface was free from shot or crude tubercle,* yet the tuberculous deposit was found in the parenchyma, and there was a communication between the deposit and the pelvis, and from it was discharging that acrid tuberculous urine which had so scalded and so swollen the lining of the ureter that its orifice was changed from a slit to a round, clear-cut hole.

M—, æt. 34 (Case 29). There is a history that for twelve months he has had pain in the right renal region (costo-vertebral angle), and that for two months he has had bladder distress. Frequency: two hours day, two hours night; pain on urination from perineum to the glans penis and a little blood, all these symptoms being aggravated by exertion.

Tubercle bacilli were found in the urine in fair numbers.

Cystoscopy.—Right ureteric orifice was a narrow, sharp-edged "golf hole"—not apparently displaced. Around the opening were

deep red folds. Left ureteric orifice healthy. Posterior wall ulcerated superficially with adherent muco-phosphatic deposits.

FIG. 40.

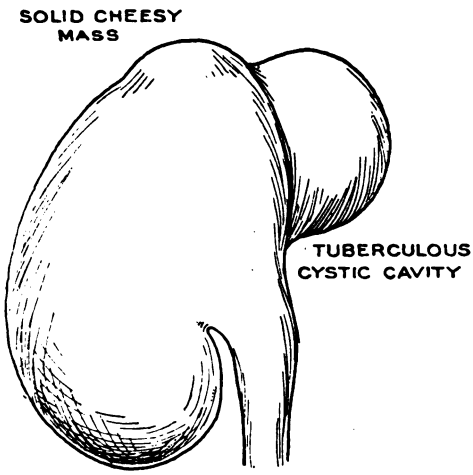


Diagram of M—'s kidney (Stanley Boyd).

FIG. 41.

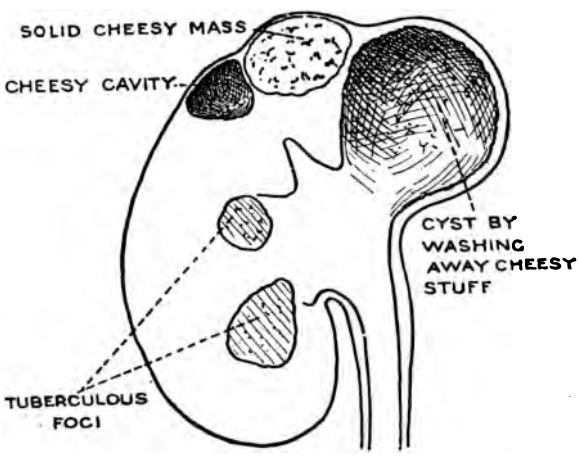


Diagram of longitudinal section of M—'s kidney (Stanley Boyd).

Nephrectomy.—Right kidney removed by Mr. Stanley Boyd, to whom I am indebted for his own rough sketches of the organ.

At and towards the upper pole was a hard yellow projection, the cortical expression of masses of crude tubercle (Figs. 40, 41). Two of the lower pyramids contained tuberculous material. The pelvis was swollen; its mucous membrane was soft but not ulcerated. Irritability of the bladder subsided completely, so that a few weeks after the nephrectomy the patient said he could hold his water any length of time.

Mrs. X—, æt. 29 (No. 36). In 1892 over-held water, and since then bladder distress. Frequency, pain, blood.

1893.—Dragging in left loin.

1897.—Cystoscopy. Left ureteric orifice a large golf hole, not displaced; right ureter healthy.

FIG. 42.

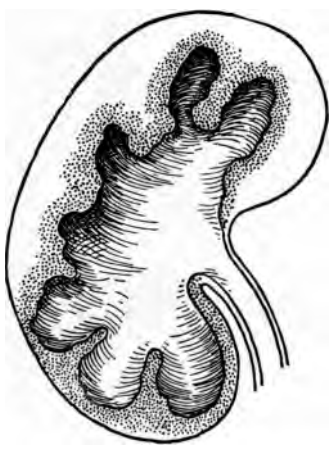


Diagram of tuberculous erosion of pelvis of Mrs. X—.

1897.—Left nephrectomy. Kidney very adherent; surface quite red, but cortex dimpling freely here and there on pressure of the finger. Longitudinal median section (Fig. 42) showed pelvis ulcerated, the parenchyma being hollowed out into small, irregular cavities, extending from the pelvis to the cortex, filled with creamy curd-like material and lined with tuberculous material, in which the tubercle bacilli were found. Largest cavity in lower pole. Ureter thin and narrow.

1899.—Cystoscopy. Left ureteric orifice unchanged—an irregular golf hole.

1900.—Still frequency.

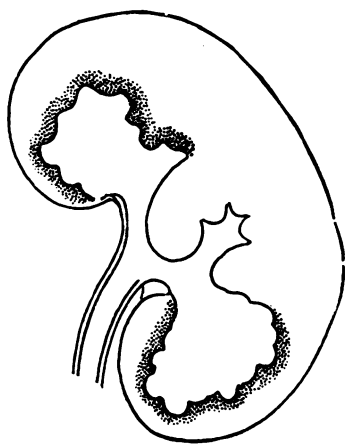
1903.—In good health, but still frequency.

Mrs. L—, æt. 24 (Case 27). For twelve months has had suprapubic pain on lying down or stooping. It is worse on urination. Some pain in left loin occasionally. Frequency: ten minutes day, every half-hour night. Mother died, aged twenty-eight, of phthisis. Tubercle bacilli in urine in large numbers.

Cystoscopy (March 31st, 1900).—Left ureteric orifice a golf hole, not displaced. Right ureteric orifice healthy. Left lower wall posteriorly covered with small red pinchings-up of mucous membrane. Surface erosions and little points of hæmorrhage.

Nephrectomy (May 7th, 1900).—Left kidney large, appeared quite healthy; no shot of tubercle on surface, no crude tubercle visible.

FIG. 43.



Tuberculous erosion of upper and lower calices (Mrs. L—'s case).

The cortex of kidney dimpled at the upper pole, and on cutting it open a tuberculous cavity was seen. The kidney was thereupon removed; two irregularly excavated cavities lined with tuberculous material existed at the upper and lower poles. The main pelvis was soft and healthy; the ureter was healthy (Fig. 43). Much relieved in every way.

Clinical Conditions co-existing with a "Holed" Ureter.

It will be noticed that in these three which I quote, *pain* was present in the kidney. It would naturally be

expected that some such symptom referable to the kidney would be always present if the kidney is tuberculous, whenever the orifice is golf-holed, but this apparently is not so. In most of the cases (50 per cent.) there is NO complaint of any renal pain. In only 28 per cent. is there any marked renal pain mentioned. Is the renal tuberculosis then latent? for the patient is only distressed by supra-pubic or rectal pain and by frequency of urination. I believe so. The connecting link lies in a case which consulted me for vesical irritability (Case 20). There was a golf-holed ureter, but there was never any renal pain in the entire history of the case, until a fortnight before the lady died. But even without this link I am satisfied that the kidney may be actively tuberculous without pain, for I have removed the kidney for advanced tubercle, and yet no pain has been noticed in the organ.

On glancing through this list of fifteen cases the reader will note how *early* the "golf-hole" condition was found in the symptomatology of the disease.

Fifteen Cases of "Golf-holed" Ureteric Orifices.

Case No.	Sex and age.	Bladder symptoms.	Kidney symptoms.	Condition of ureteric orifice.
1	F., æt. 24	6 months	14 days' right renal uneasiness	Right golf-holed.
3	M., æt. 24	2 months	None	Right golf-holed.
8	M., æt. ?	Some months	None	Left golf-holed.
16	M., æt. 28	1 month	2 months' left renal pain	Left golf-holed and drawn out.
19	F., æt. 44	18 months	Indefinite left loin pain	Left golf-holed.
20	F., æt. 24	18 months	None	Left golf-holed.
25	M., æt. 30	5 weeks	None	Right golf-holed.
27	F., æt. 24	12 months	Occasionally left loin pain	Left golf-holed.

no renal pain is complained of, that the deposit in the kidney is not large, and that it can be ameliorated by Koch's injection.

But if the case does not present itself early, say within a year, and renal pain is, or has been, a marked and continuous feature, nephrectomy of that side should be carried out. But here a word of caution. The pelvis is affected at first, not the cortex, so that no surgeon, in attacking a kidney which has been the site of *continuous pain,* should, if a marked golf-holed ureteric orifice exists on that side and tubercle bacilli are in fair numbers in the urine—no surgeon should, I say, be deceived by encountering a healthy red-looking kidney without shot or yellow blemish on its cortex, and possessing a healthy soft pelvis or ureter. The disease is within, and I have known the surgeon so deceived by the healthy cortex that he has replaced such a kidney. Let the operator examine first the upper and lower poles for dense adhesions. If they are found he should feel if the cortex is thinned, or if it dimples under pressure of his finger here or elsewhere. If it does, he can cut boldly* into the thinned area and examine the cut surface for tuberculous ulceration extending from an eroded pelvis. At either pole or at some other area on the cortex this evidence will be generally obtainable, and then nephrectomy can be conscientiously carried out, to the relief of the patient's lower urinary distress.

To recapitulate, a golf-holed ureteric orifice denotes a ureteric tube swollen and atonic, but not tuberculous; it indicates a tuberculous pelvis, and a kidney which, if renal pain has been a marked symptom, should be removed, the other kidney acting healthily; but if renal pain has been slight or absent it should be treated by courses of Koch's injections, for the ureter is open and can carry away the sloughs cast off by the action of the tuberculin. The golf-hole ureteric orifice may prove to be some index to the frequency of latent renal tuberculosis.

* A light spring vessel-clip on the renal vessels will render such a search bloodless.

B. *The Displaced, "Dragged-out" Ureteric Orifice.*

I have briefly alluded to this unusual condition (page 8), and I now state my opinion that when it is met with, and tubercle bacilli are also present in the urine, it affords the most conclusive *cystoscopic* evidence that we possess of the partial destruction of a small, often unfeelable kidney by tuberculosis. I will try to enlarge somewhat upon this theme, and to give reasons for my belief.

Original Case.

The case which brought the condition before my notice was seen by me in 1885, and noted as follows:

A man æt. 27 was under the care of a colleague with incontinence of urine. He had a renal tumour on the right side, very painful at one spot, and there was a history of renal colic over a period of four years.* The right kidney was opened and a quantity of pus evacuated. The patient died. On post-mortem I found the right kidney a multilocular sac, containing inodorous pus; cortex extremely thin; pelvis very much dilated, its mucous membrane ulcerated and tuberculous. The right ureter from the hilum of the kidney to the bladder was greatly thickened, especially in its upper third, where it resembled a thick thumb. Its small canal was eroded here and there with ulcers which were tuberculous, whilst dense clumps of caseous material blocked the canal at various points.

The left kidney was large and congested. Prostate: right lobe had two masses of crude tubercle the size of horse-beans.

On opening the bladder fine miliary tubercle was seen scattered over the eroded surface, interspersed with small yellow clumps of tubercle.

I noted especially—

1. The interureteric bar was much thickened.
2. The right ureter at its junction with the bladder was embedded in a mass of indurated inflammatory tissue.

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* Author, "Case of Exfoliating Cystitis," 'Path. Soc. Trans.,' vol. xxxvii, p. 310, 1886.

3. That the right ureteric orifice, as seen in the bladder, was drawn quite out of its usual place, probably about a quarter of an inch.

4. That the muscle wall of the right side of the bladder was thickened in the neighbourhood of the ureteric tract.

This displaced ureteric orifice now attracted my attention in cystoscopy in reno-ureteric tubercle, and from the cases I have noted in which tubercle was proved to exist I feel certain I can make the following statements.

Aspect of the Dragged-out Orifice.

Instead of the ureteric orifice of the tuberculous kidney being an inch or an inch and a half from its fellow, and at the same distance from the urethral orifice, it is seen to be as much as two inches from either opening, the interureteric bar on which it opens being unduly lengthened. Moreover the wall of the bladder around the displaced orifice seems "pulled out," so that the viscus is slightly distorted, and a sort of funnel appears in the side of the bladder base, as if a finger and thumb had hold of the ureter in the loin and was dragging it upwards and outwards. Indeed, in one or two cases in which the diseased kidney had been fixed by the surgeon under the supposition that it was a movable kidney, the side of the bladder where the ureter is inserted was so dragged out that it formed a deep tunnel of mucous membrane, in the depth of which the ureteric opening could not be seen. When seen the orifice is distinctly changed, being patulous, irregular in shape, and its wall is thick and caked.

In every case ulcerations of a typical tuberculous type, with red patches of extravasation, were visible in other parts of the bladder.

Lastly, it would appear from my cases that the ureteric change takes years (average four to five) before it becomes characteristic, and is therefore essentially the type of chronic, long-continued change.

Pathological Characteristics of the Dragged-out Ureter.

One very salient feature will probably strike the observer at once. It is that the stress of the disease has apparently fallen upon the ureter, and has enlarged that tube so greatly it may even resemble a thumb or forefinger in thickness. This increase in size is mainly due to an enormous inflammatory thickening of the walls of the tube, for the centre channel is narrowed—so much so that on section the tube reminds one of a giant vas deferens. Often as not this fine irregular channel is blocked by caseous particles, and even on post-mortem its sinuous windings are difficult to follow.

In consequence of this ureteric obstruction there is almost invariably great renal destruction, for that noticed is more the result of urinary back pressure and inflammation than the effect of the tuberculous processes, although these are also present.

The kidney may be small, useless, non-secreting, its pelvis ulcerated, its calyces dilated, its cortex thinned, its small cavities filled with thin gruel, or inodorous pus, or cheesy material, and small phosphatic concretions; or, if infection has contaminated the obsolesced material, the kidney may be found inflamed, having rapidly enlarged until it has been transformed into a multilocular abscess sac, from which, under the pressure of the sudden accumulation, pus may leak little by little along the blocked ureteric channel into the bladder. Usually, I repeat, the kidney is a dry kidney, which has apparently given up work in an early stage of the disease from the block of the ureter; but it is one which still continues to cause renal colic or suffering of some severity.

The ureter is adherent in its entire course. Towards the bladder the ureter is found embedded in much inflammatory material, and as the canal enters the bladder, that part of the viscus is thick, indurated, and inelastic.*

Microscopically.—Great chronic inflammatory thickening of the walls is present; the lumen is lined by granulation

* Cf. original case, page 499.

tissue, in which giant-cell systems are present, but usually the tubercle bacilli are absent. The lining epithelium is absent.

The Clinical Aspects of a Case of "Dragged-out" Ureteric Orifice.

The clinical features of a case in which a dragged-out ureteric orifice is found are strikingly different from those noticed in the "golf-holed" variety.

The "dragged-out" is not found a few weeks or months after the onset of bladder symptoms, as is the "golf-holed." It is noted only after some years of kidney pain. The retraction is, I presume, an indication of an advanced stage of ureteritis and periureteritis, and therefore a clue to the chronicity of tuberculous disorder.

Moreover the character of the onset is distinctly that of renal suffering, which, for severity and persistence, is in marked contrast to the "golf-holed" variety. In some the character of the renal pain has been that of distinct renal colic, due probably to the absolute block in the swollen canal of the ureter, but in some, at least the channel, though tortuous, remains open, and in these absolutely fixed renal pain is present.

No.	Sex.	Age.	Symptoms.	Condition of ureter.	Condition of orifice.
2	F.	35	5 years' right renal pain (tumour)	?	Right orifice retracted.
11	M.	25	8 years' left renal pain	?	Left orifice retracted.
13	F.	38	3 years' right renal pain (tumour)	?	Right orifice retracted.
15	F.	22	3 years' right renal pain	Thickened	Right orifice retracted.
24	F.	40	5 years' right renal pain	⅓ inch in diameter	Right orifice retracted.
28	F.	24	2 years' right renal pain	Enormously thick	Right orifice retracted.
41	M.	27	4 years' right renal pain (tumour)	Enormously thick	Right orifice retracted.
42	M.	?	—	Enormously thick	Right orifice retracted.
48	M.	26	7 years' left renal pain	?	Left orifice retracted.

The condition of the kidney is in accordance with the tendency to ureteric obstruction. It may be swollen by the dammed-up tuberculous deposits and pus, and therefore feelable as a hard, tender, *fixed* tumour in the renal region, or the fluid part may be absorbed, and the kidney, becoming smaller, may retract under the ribs and be indistinguishable on palpation.

I have watched these fixed, enlarged tuberculous kidneys contract in size and retract in position in course of two or three years.

These statements may be exemplified by the following cases.

Miss McP—, æt. 40, brought to me in April, 1901, for cystoscopy.

History.—May, 1896.—Sudden attack of severe pain definitely referred to the right iliac region, accompanied by vomiting and vesical tenesmus. At first the attacks recurred at intervals of one month, but gradually they became more frequent, often a week only intervening. The lady was seen by an experienced physician, who thought an enlarged appendix could be distinguished "rolling under the finger." The urine showed a trace of albumen.

1897.—Right kidney found displaced; the attacks were therefore considered to be renal colic by a well-known hospital surgeon, and the kidney explored for calculus. "The kidney was incised, its pelvis explored; the renal substance and the pelvis were found perfectly normal." A urinary fistula remained for many weeks. It then closed, but reopened occasionally; pus always found in the urine in considerable quantities, and the old pain recurred from time to time.

November, 1900.—Much hæmaturia, with bladder tenesmus.

Cystoscopy (E. H. F.) (April, 1901, *five* years after the first renal symptom had appeared).—Right ureteric orifice and interureteric bar pulled right out of its place, the former being hidden by an overlapping fold of the mucous membrane of the right lateral wall of the bladder, the edge of the projecting fold being papillated and of a deep red colour. Small red tuberculous-looking areas over posterior and superior wall. Left ureteric orifice slightly swollen.

Diagnosis.—Chronic right renal tuberculosis with great thickening of the right ureter (periureteritis).

Operative indications.—Right nephrectomy and ureterectomy.

Prognosis.—Good.

May, 1901.—Tubercle bacilli found in urine.

May 23rd, 1901.—Right kidney and ureter removed by Mr. J. M. Cotterill, in Edinburgh. The following details were very kindly supplied to me.

The right kidney and as much as possible of the ureter were removed from behind. A great deal of adhesion was found as the result of the former operation. The ureter appeared uniformly thickened, rather more than one third of an inch in diameter. Its lumen was unobstructed. The kidney was about normal size, but irregular in contour. On section it looked at first sight like a "surgical kidney," and it presented three or four cavities the size of small hazel-nuts containing turbid fluid. There was no caseous matter visible anywhere to the naked eye, but there were numerous little grey nodules scattered over the surface of the organ and over the section. There seemed to be very little secreting kidney substance left. The renal pelvis was not dilated at all.

The kidney and ureter were submitted for microscopical examination to Dr. D. A. Welsh, who sent the following report:

"Sections in paraffin were made from the following parts:

"1. *Renal tissue in places not destroyed by excavation.*—This showed numerous foci of tuberculosis, both in cortex and in medulla. The resulting nodules showed caseation, numerous giant-cells, and usually an extensive overgrowth of connective tissue spreading out into the kidney tissue. Between these nodules the kidney showed some interstitial nephritis and chronic catarrh.

"2. *Renal tissue bounding walls of cavities in kidney.*—The sections represent the whole thickness of the renal tissue between the cavity and the capsule. The lining of the cavity consisted in tubercular granulation tissue containing some giant-cells. The overlying renal tissue showed an extreme degree of chronic interstitial change, with obliteration of most of the glomeruli (which were reduced to hyaline necrotic masses) and atrophy of the tubules. The interlobular arteries were largely occluded by a proliferative endoarteritis.

"3. *The ureter (about two inches beyond the hilum of kidney).*—On cross-section showed great chronic thickening of its walls. The lumen was lined by granulation tissue, in which giant-cells were present. The lining epithelium had entirely disappeared. The lumen, however, was quite patent, a fact that is consistent with the small size of the excised kidney, and the absence of any degree of pyonephrosis. Moreover, in the sections of the kidney in its more healthy portions there was some tissue left which would be capable of secreting to a small extent.

"4. *Sections were made of the renal pelvis also,* but, beyond the

fact that it appeared to be lined by granulation tissue, I could not make much out of it, owing to the way in which the sections had been made."

I can add an interesting sequel-fact to the above. The lady returned to me for cystoscopy in October, 1901, after having several courses of Koch's tuberculin.

Right ureteric orifice, which before was invisible and dragged out, now visible in its proper place, but the opening is gelatinous and indistinct. Over the posterior wall a few patches of red submucous extravasation still remain. Left ureteric orifice swollen, but not enlarged. Patient apparently in the best of health, and free from all symptoms.

Another case, but one in which from first to last no tubercle bacilli could be found in the urine. I specially quote this because I believe it is not an uncommon feature of this particular group.

Mrs. L—, æt. 24, sent by Dr. Fowlie, of Singapore.

July, 1896.—Pain in right side over front of kidney. Tried to make water and could not. After an hour's straining she passed it. Slight traces of albumen found.

August, 1896.—Married.

December, 1896.—Pain on urination; also a dull pain in right side.

February, 1897.—Frequency in micturition, and pain in bladder in coition. Could not lie on right side, because of the pain it caused in her bladder. Can sleep on left side.

Cystoscopy (July, 1898).—Right ureteric orifice like an open miniature crater; edges very red, and tucked in "as if a finger outside the bladder was drawing the ureter up into the loin." Pus efflux in puffs. Left ureteric orifice healthy. Bladder held 12 oz. Patches of red infiltration on posterior wall.

Nephrectomy (July, 1898).—Right kidney very adherent, especially at upper end, but not tuberculous to sight or touch. Pelvis wall thickened. On section the entire kidney was seen to be eaten out into larger and smaller tuberculous abscesses, containing gruel-like pus. Aspect typical. Ureter enormously thick, like a huge thumb. Channel minute. It was resected to brim of bony pelvis. Healed readily.

1899.—Pregnant. Gave birth to fine boy.

Cystoscopy (July, 1900).—Right ureteric orifice: two columns of

scar tissue seemed to arise from this orifice and radiate backwards to the postero-superior wall. Left ureteric orifice not seen. Entire posterior wall covered with small fine tubercles, some yellow-spotted.

July, 1901.—Bladder certainly reddened, but no ulceration. The right ureteric orifice not particularly noticed, but streaming vertically from its position were two or three strong scar bands in the mucous membrane. Left ureter red, unhealthy; lips a little thick.

July, 1903.—Well. No frequency. Boy strong and well grown. Husband dying of phthisis.

Mem. (July 6th, 1898).—No tubercle bacilli in urine.

July 7th, 1898.—No tubercle bacilli in urine.

June 9th, 1902.—No tubercle bacilli in urine.

July 3rd, 1902.—No tubercle bacilli in urine.

March 10th, 1903.—No tubercle bacilli in urine.

Probable Cause of the Dragged-out Ureteric Orifice.

After investigating the *fact* of the "dragged-out" orifice in renal tuberculosis I cannot but suspect the following cause:—In every case which I have been able to operate upon, or examine the ureter visually and digitally, that tube has been more or less thickened, ranging in size from a thick lead pencil to a thumb. In every case the kidney and the entire ureter have been fixed by adhesions. This fixation is merely inflammatory (a natural effort to shut off the dangerous element from the otherwise healthy body). The contraction which takes place in course of time in this inflammatory mass, in its length, puts the ureteric tube on the stretch. Moreover, I suggest that in certain cases there is a great tendency to fibroid change which increases the retraction. Perhaps the clue to the causation of fibroid phthisis would furnish the correct solution to the problem of these retracting ureters. Any way, in some cases the "drag" on the ureter seems to arise when the kidney recedes under the ribs towards the liver or spleen, as it often does in inflamed kidneys. In other cases the "pull" appears to be from the contraction in the length of the lower ureter.

have seen, I think, a markedly dragged-out ureter assume its proper position in the trigone after its kidney had been cut away, and the ureter acted on by tuberculin (Koch's new T. R.)—in other words, when the cause of the "pull" was removed. But I have seen, I must admit, an orifice gradually "dragged out" after the kidney has been removed, the bladder being thrown into deep folds at the circumureteric area (Case 32). I mention these conflicting cases, I cannot reconcile them at present; probably increased experience will afford a clue.

Certain questions of importance present themselves.

Is a displaced ureteric orifice a mark of chronic renal tuberculosis, or does it merely indicate chronic infiltrating ureteritis?

I have certainly met with minor grades of displaced orifices in cases of simple infiltrating ureteritis, but I have not seen a typically dragged-out opening except when tubercle was present in the kidney, and there was great thickening of the entire ureter. Still this may be an error which increased experience may rectify.

I do not wish to convey the impression that the anomalous position of the orifice is the direct outcome of renal tuberculosis, for many cases will be met with in which chronic renal tuberculosis is present, and yet the ureteric orifice is in its normal position, though its contour and appearance will be altered. It was present, in fact, in only nine cases out of 50 of urinary tuberculosis (18 per cent.).

Is the displaced ureteric orifice a mark of primary ureteric tuberculosis?

The renal pain and colic frequently noticed as onset symptoms in these cases rather point to the occlusion of the ureter as being an early change, which leads to the suspicion that in this class of case we have to do with *primary ureteric tuberculosis.* In fact, I believe I have met with a case which will substantiate this belief—a case in which the ureter was enormously thickened and

blocked, and the kidney merely atrophied. I have also removed a kidney in a very early stage of tuberculosis in which the lower ureter seemed shut off by great thickening, but in which there was no change in the ureteric orifice (Case 38, page 192).

It is significant in most of the cases I have operated upon with greatly thickened ureters that the renal changes appear to be mostly due to back pressure, though tuberculosis is also present. I have been much impressed by a series of four cases in which the ureter was invaded by a psoas abscess. In these the thickening of the ureter and the ulceration of its mucous membrane were somewhat similar to those noticed in ureters with displaced orifices.

I opened a right lumbar abscess in a woman and evacuated 20 oz. of pus, removing at the same time a piece of bone from the second lumbar vertebra. The entire length of the right ureter was thickened, and in size, shape, and feel it resembled a thickened vas deferens. Here and there it was knotty—the *kidney felt healthy*,—a statement which may not be worth anything. On cystoscopy the right ureteric orifice was small and round, and had its lower lip ulcerated.

The Causation of Chronic Infiltrating Ureteritis in Renal Tuberculosis.

Why there should be so great a swelling of the ureter in a comparatively small number of cases of urinary tuberculosis is a subject upon which I must not dogmatise.

It is interesting to notice how often these cases occur on the right side, and that not infrequently the microscopy reveals a short bacillus in the urine which might be classed as a variety of the colon bacillus.

If I might speculate, I should rather lean to the theory of a mixed infection—the penetrative power of some form of bacillus irritating the middle and outer coats of the ureteric tube; and I would question whether we have not similar changes in the extreme thickening which takes

place around the kidney (perinephritis) in certain cases of pyelonephritis. Perhaps also an analogy exists in the great thickening of the abdominal wall in chronic appendicitis, with formation of pus in the cellular tissues behind the cæcum.

Clinical Deductions.

To my mind the two main lessons I have been taught by a retracted, displaced ureteric orifice (tubercle bacilli being found in the urine) are these:

The ureteric channel is too warped and contracted to allow further passage of the waste products cast off from the kidney by the action of the new tuberculin. Its exhibition is therefore attended with some danger by causing the kidney to swell with retained discharges. Secondly, the extreme amount of perinephritis and periureteritis is nature's method of walling in tubercle and limiting its action. Hence the chronicity of such a case, and in absence of septic infection of the bladder and the opposite kidney, the comparatively favourable prognosis and the hopeful outlook after nephrectomy.

But it must not be concluded that the "dragged-out" orifice is the only cystoscopic indication of a thickened or choked ureter. The probability is that the mere *displacement* of the orifice is the *final* expression of a *greatly* thickened ureter, and that lesser grades of thickening are seen earlier in the course of the case, and the cystoscopic evidence of these lesser degrees of thickening is not so much the displacement as the visible change in the structure and contour of the orifice, its edges becoming thickened, inlaid often with a wax-like substance, the opening thereby rendered irregular and warped. This condition, then, forms our next group of orificial changes in tuberculosis.

c. *An Irregular, Thickened, Choked Ureteric Orifice denotes a Thickened, Choked Ureter.*

I cannot, perhaps, illustrate this condition better than

by quoting one of the cases in which the appearance was well marked.

Mrs. B—, æt. 21 (Case 39), sent by Mr. McGregor Young, of Leeds, in October, 1899.

In September, 1896, three years ago, she suffered from severe *left* renal colic, the pain commencing over the front of the organ. These attacks recurred twice or thrice a week, always with pus in the urine. She was said to have a movable right kidney, but tubercle bacilli were found in the urine, and I was asked to cystoscope.

Cystoscopy (October, 1899).—*Left* ureteric orifice: a distinct visible thickening of the left ureteric bar, and on it was a small, round, much narrowed, normally placed opening of the left ureter, with a little tongue of red mucous membrane prolapsing from it like a caruncle in the female urethra. Right ureteric orifice healthy. Bladder healthy, though it is *three* years since the renal colic commenced, only the veins of the post-trigonal space being large and markedly full.

Operation.—Left kidney small and adherent. A small shot-like tubercle on the cortex at the upper pole of the organ, otherwise kidney looks healthy. On section the pelvis was seen to be extensively eaten out into tuberculous cavities. The *ureter* was thick like a huge lead pencil, and at its orifice with the renal pelvis there was a thick layer of crude tubercle.

Mr. J. H. Targett reported: "The surface of the kidney is coarsely nodular, but the capsule is not adherent. On section there is caseous pyelitis, and numerous breaking-down foci in the cortex. Microscopical examination shows an abundance of grey and caseous tubercle in the cortical substance, and much evidence of interstitial nephritis with fibroid glomeruli, and atrophy of the glandular tubules."

September, 1900.—Patient married.

July, 1903.—Mr. McGregor Young reports: "At present she is in excellent health, and pregnant six or seven months. This is the third time she has been so. It is a curious fact during each of these three pregnancies (one of three months, the second of six months, and now this of seven months) she has been in exceptionally good health. Between these times her health is of the delicate order. She has no bladder symptoms and no kidney pain, and no albuminuria at any time."

The cases I have had of choked ureters are probably four in number. I have seen more, but I cannot quote

them without the discovery of the tubercle bacillus or operation to demonstrate beyond doubt the presence of tubercle, and these clinical essentials were lacking. This reservation introduces the remark that all warped orifices are not tuberculous. They point merely to a choked ureter, viz. one that has undergone chronic inflammatory change.

No.	Sex.	Age.	Symptoms.	Ureter.	Condition of orifice.
17	M.	24	13 months' attacks fixed left renal pain	Blocked and pyelitic (nephrectomy)	Left side everted, lip ulcerated, circumureteric area ulcerated and œdematous.
18	M.	37	2 years' right renal pain, fixed	A little thickened; no lumen (nephrectomy)	Right small, red, and contracted; surrounding area blotched with blood.
39	F.	21	3 years' left renal colic	Ureter, like a large lead pencil, blocked at pelvis (nephrectomy)	Small, narrowed, and thickened.
46	M.		3 years	?	Circular, dull grey; blotched with blood.

D. *Massive Œdema of the Ureteric Orifice.*

There is one condition which is apparently rare (6 per cent.) in primary renal tuberculosis, and yet sufficiently characteristic to merit attention. I refer to an enormous swelling of the ureteric lips and area. It may be that this is but an early stage of the periureteritis which I have just discussed—for the symptoms are the same and the cases I have observed have all been right-sided. It is, as I have pointed out (page 144), not uncommon to find an enormous œdema of the orifice when a stone is lodged at or very near the ureteric opening and is causing a local venous pressure, either mechanically or by the inflammatory reaction it induces, but it is rare in tubercle.

I have only met with it on three occasions—Cases 22, 23, and 30.

A young lad, æt. 19, was sent to me by Dr. Weakley for right renal pain, which he had suffered from for twelve months on and off. It was not severe, and there was no nausea and no other symptoms. Finding a little pus in the urine, I examined with the cystoscope, and found the right ureteric orifice and its immediate surroundings puffed out into a globular œdematous swelling the size of a large monkey-nut. The little tumour was almost translucent; it glistened under the light, the thin vessels marking its surface like watered silk.

The left ureteric orifice was healthy.

The urine contained tubercle bacilli in small numbers. There was a small amount of pus. Minute ill-formed crystals of calcic oxalate. No casts. A few renal pelvic cells and a trace of albumen.

He was given two courses of Koch's new tuberculin, and again examined. The œdematous orifice was flattened, but still protuberant, and was distinctly of a darker colour.

He left for South Africa, and on his return two and a half years later he reported himself well in every respect. I cystoscoped, and found the right orifice normal in every respect and the rest of the bladder healthy. On examining *per rectum* I detected a small tuberculous deposit in the right lobe of the prostate. There was no tubercle in the urine.

No.	Sex.	Age.	Symptoms.	Condition of ureteric orifice.
22	M.	30	Right renal pain	Right ureteric orifice enormously puffed.
23	M.	38	2 years' right renal pain; colic	Right ureteric orifice enormously puffed.
30	M.	19	12 months' occasional right renal pain	Right ureteric orifice greatly puffed.

The Analogy of Œdema of the Orifice with Œdema of the Ureter in Impacted Oxalate of Lime Stones.

Without straining a point, I notice that in one case of œdema of the orifice in renal tuberculosis (Case 30) the urine contained oxalate of lime crystals. It is a fact that

most of the instances of huge œdema of the orifice in descending stone (*v.* p. 144) occurred where the calculus was composed of oxalate of lime. But more than this. On two occasions, when I have had to cut upon the upper ureter for impacted stone, I have found a section of that tube quite bulbous, and in appearance exactly like a greengage plum. The tissues were œdematous and of lightish green colour. After dissecting through many juicy layers a small oxalate stone was found in the centre. I have only seen this condition twice. Although the causation is not apparent, yet the above facts rather suggest that oxalates have the power of producing marked œdema of the mucous membrane, and it may be that it is the co-existence of an oxaluria which determines the unusual orificial swelling in renal tuberculosis, to which attention has just been directed (p. 183).

To recapitulate, as far as I can judge, the classes A, B, C, D, relate to changes descending from the kidney to the bladder.

In the first—the "golf-holed orifice"—we have evidence, I think, of latent early tuberculous disease of the kidney scalding the ureter, but renal symptoms are not always present.

In the third—the narrowed, irregular, choked orifice—we have, I think, an advance upon the first in the point of age; in other words, a contracting channel.

In the second—the "displaced orifice"—we have the channel retracting and pulling the opening away from its normal position.

In the fourth we have a doubtful early acute pyelitis of tuberculous origin swelling the orifice.

The weakness of the matter is this. In every case the clinician must be satisfied by bacteriology or the cystoscopy that he is dealing with urinary tuberculosis, for in no case are the changes in the ureteric orifice the outcome of tuberculosis *per se*. They are merely the evidences of the inflammation which tuberculosis induces in the ureter in about 50 per cent. of all cases.

We have now to discuss the remaining cases, and some of the appearances seem to me to mark an "*ascending*" change, but of this I cannot speak at present with certainty.

E. *The Ureteric Orifice and Area are lost in a Vivid Red Submucous Extravasation of Blood.*

It is difficult to say what this appearance may denote. It is a definite change. The entire orifice and area are so blurred in a scarlet or dull red hæmorrhagic blotch that the details of the orifice are not clear, and often the opening itself cannot be distinguished.

The most characteristic case was that of a woman æt. 47 (Case 45), sent me by Mr. Gifford Nash, of Bedford.

Twenty years ago she had had symptoms of left renal pain, which was apparently due to intermittent ureteric obstruction. Thus the pain commenced in the left side; it passed towards the navel. She threw herself about, drank hot water, and in half an hour to an hour the pain left her and she passed a quantity of water.

She married and had children, and was free from any renal symptoms after childbirth. ? Fixation of kidney after uterine pressure.

At the age of forty, that is seven years ago, the left renal pain returned, though less violent. Two years ago a knife-cutting pain appeared in the urethra when she micturated, also frequency. This pain became continuous and was increased by exercise, so that now she is unable to walk.

The cystoscopy revealed the entire left half of the bladder to be white and scarred with old surface erosions. The left ureteric orifice could not be seen; its area was scarlet with submucous hæmorrhage.

Nephrectomy.—I removed a tuberculous multilocular left renal sac, the pedicle being embedded in tough fat, and the ureter as thick as a lead pencil, the channel being small. She recovered, but still suffered much from vesical irritability.

It cannot be said that the deep circumureteric extravasation points absolutely to renal implication. One sees it, but less marked, in descending stone when that body has reached the vesical orifice of the ureter (cf. p. 142), but

it certainly demonstrates that the ureter is becoming implicated. I append the cases I have noticed, and must await further experience for a clue to the direct indication which the appearance may convey.

Case.	Sex.	Age.	Bladder symptoms.	Kidney symptoms.	Aspect of ureteric opening and area.
3	F.	25	No symptoms, though posterior wall was peeling	None	Right, deep red.
21	F.	23	3 years' cystitis	Aching right kidney	Right, lost in general redness.
44	M.	40	6 months' cystitis	None; right kidney movable and enlarged	Right, blood-red and ulcerated.
45	F.	47	2 years' bladder	Pain in left kidney for 7 years	Left, obscured by a scarlet extravasation.
47	M.	14	6 months' bladder	2 days' pain in right kidney	Right, deep red.
50	M.	32	6 years' bladder	None	Right.

F. *Unclassified Changes.*

It is, of course, unsatisfactory to find there are appearances which cannot be classified, but I am unable to group a few, for the appearances of the ureteric orifices and their surroundings under the influence of extensive vesical ulceration are so varied.

In one (Case 4) the orifice was so detached by surrounding ulceration that it looked like a loose empty sleeve-cuff. Others were thoroughly eroded or buried in ulcers (Cases 7, 14). In another there was a mound-like swelling of the entire left ureteric area, powdered with white lime phosphate. This may have been a massive œdema of the orifice (*vide* page 144) covered with white gravel (Case 32), for I removed the left kidney; it proved to be a large, suppurating, tuberculous kidney, and the ureter was thickened. I examined this case a year later. To my surprise the left ureteric orifice could not be seen; it was pulled out of its place, the bladder being thrown into

deep folds at this spot. The right ureteric orifice was undergoing changes.

In two others (Cases 9 and 12) the ureteric orifice showed warping and irregularity, and seemed surrounded by a thick greyish film.

Analysis of Fifty Cases of Proved Urinary Tuberculosis.

		Per cent.
The "golf-holed" orifice	15	... 30
The retracted orifice	9	... 18
The choked orifice	4	... 8
Massive œdema of the orifice	3	... 6
Vivid red periureteric extravasation ...	6	... 12
Unclassified	7	... 14
No changes visible in the orifice ...	6	... 12
	50	100

CHAPTER X.

CASES OF RENAL TUBERCULOSIS IN WHICH NO CHANGE IN THE URETERIC ORIFICE COULD BE SEEN.

Cases of primary tuberculosis of the bladder, in which the ureteric orifice appears only a little swollen or not at all affected, must come under the observation of the cystoscopist, for the ureteric orifice is not always affected quickly in *vesical* tuberculosis, and patients are beginning to present themselves for routine cystoscopic diagnosis at very early stages of their clinical history.

Moreover, it would seem that there are well-marked cases of renal tubercle in which the disease appears to be shut off from the bladder by interstitial contracting ureteritis, and these do not appear to affect the bladder readily, nor alter the appearance of the ureteric orifice early. Then, again, I suspect some cases of chronic interstitial nephritis become infected with tuberculosis, and in these complex cases the ureteric changes may not be noticed early.

I will enumerate the six cases I have met with in the last fifty of my work, and then especially mention those in which renal tuberculosis existed without any evidence of the disease appearing in the corresponding ureteric orifice.

Nothing Abnormal with Orifice.

Case.	Sex.	Age.	Symptoms.	Ureteric orifices.	Bladder and kidney.
5	M.	23	4½ years' symptoms like vesical stone	Both healthy	Greater part of bladder covered with tubercle.
43	M.	23	3 or 4 months' vesical symptoms.	Both healthy	Red infiltration on *left side*; scarred bladder.
			Second examination, 4 years later, increased vesical symptoms	Both healthy	"
6	M.	24	1 year, intermittent symptomless hæmorrhages	Both swollen slightly	Posterior wall patched with extravasation.
10	F.	35	1 year of vesical symptoms; pain in left kidney occasionally	Both healthy; no signs of septic invasion of pelvis	Tuberculous ulceration of posterior wall; nephrectomy; left renal tuberculosis.
33	F.	33	5 years' bladder symptoms; 9 days' right renal pain	A little swollen	Nephrectomy; right renal tuberculosis.
38	M.	25	6 months' pain in left kidney	Not altered	Nephrectomy; left renal tuberculosis.

The cases I want to glance at more narrowly are four in number—Cases 6, 10, 33, and 38.

Case 6 was apparently one of intermittent *symptomless* hæmorrhage in a young man æt. 24, brought by Dr. Hewer. It had been noticed a year. The bleeding was bright; it was on more than one occasion accompanied by clots, and on the last occasion, which was accompanied by "discomfort" over the left renal pelvis in front, a doubtful ureteric clot was passed.

On cystoscopy both ureteric orifices were swollen and reddened, the left a little elongated. The entire posterior wall was patched with red tuberculous extravasation and pea-sized ulcers. Tubercle bacilli were present in the urine.

All that I can say definitely in this case is, that there was discomfort over the left renal pelvis for three weeks, with only swelling and elongation of the left ureteric orifice.

PLATE XIV.

Vertical section of tuberculous kidney of J. L., showing extensive destruction of pyramids and crude tubercle in the cortical zones. Nephrectomy: relief.

(Author's Case.)

Del. und Chromo-Lith. by Bale & Danielsson, Ltd.

But in the next case the orifices were more definitely free from change.

CASE 10.—A woman æt. 35, who had suffered from vesical symptoms for one year (scalding on urination, pain in supra-pubic region, increased on movement, blood in urine, bladder tender to pressure; frequency twenty times an hour), complained of occasional left renal pain. The urine was 1007. There was much pus, and tubercle bacilli were present.

Cystoscopy revealed both ureteric orifices to be healthy. No signs of ascending inflammation were present, but the bladder tubercle was obvious in the typical ulceration of the posterior wall, especially at the right lower section.

Eighteen months later this patient returned with an enlarged left kidney. I removed it but without cystoscoping to see the corresponding ureteric orifice. The kidney was very adherent; the vessels were embedded in tough fat. On section, typical tuberculous ulceration of the pelvis was present. The ureter was healthy but a little swollen.

This case is mentioned, but it will be conceded that it is incomplete. Unfortunately no cystoscopy was carried out prior to the nephrectomy, and changes in the orifice may have occurred in the interval between her first and second visit, for eighteen months had elapsed in this interval.

But the next is a definite case of latent renal tuberculosis—not very advanced, it is true, but without any visual change in the corresponding ureteric orifice.

CASE 33.—A lady was sent me with a history that she had had vesical suffering for five years, and nine days only of right renal pain. No renal tumour. Tubercle bacilli in urine in considerable numbers.

Cystoscopy showed the right ureteric orifice to have thick lips and to be pouting a little, but there was no retraction. Left ureteric orifice was a healthy slit; its lips were a little swollen.

I removed the right kidney; it was small, easily dislocated, not very adherent. The cortex looked quite healthy, except for two small shot or tubercles at the lower pole. About the middle of the anterior surface I found a thin line of crude tubercle. The cavity of the pelvis was eroded into tuberculous cavities.

The pelvic wall was thick, likewise the ureter. There were no typical giant-cell systems in the ureter, but the inflammatory tissue in the outer coat of the tube was arranged in well-defined nodules, which was very suggestive of tuberculosis. The mucous membrane was unaffected. Four and a half years later there were no bladder symptoms.

The last case I have to record is an interesting example of well-marked renal tuberculosis without ureteric orificial change.

CASE 38.—A patient, a male aged 25, was sent to me with a kidney radiograph and a diagnosis of four small stones in the left kidney. There had been no vesical symptoms, but great pain in the left kidney for six months. The urine was stated to be absolutely normal; no blood nor albumen, sp. gr. 1022, only a few pus-cells.

I disagreed with the X-ray diagnosis, because the shadows were small and much scattered.

On cystoscopy I found there was no abnormality about the left ureteric orifice. It might possibly have been a trifle larger than the right. The vessels of the trigone were unusually well marked, but there was no evidence of tubercle in the bladder.

Nephrectomy.—On cutting on to the left kidney I found it much enlarged and very adherent, but there was no evidence of tubercle on the surface. I introduced a trocar into the body of the organ and drew off some ounces of inodorous pus and urine. Controlling the vessels at the hilum I laid the kidney open along the cortex, and found the pelvis to be tuberculous. I thereupon removed it. On bisecting it, each pyramid was seen to be almost eaten away into irregular cavities, the base of each being occupied by crude tubercle which had not broken down (Plate XIV). The pelvis was thickened and dilated, the mucous membrane deeply congested and inflamed, but not ulcerated. The ureter for the upper four inches was dilated and thick-walled. It was blocked below by interstitial thickening. This case, I presume, is one of primary renal tuberculosis with interstitial ureteritis, the channel of the ureter being blocked about the pelvic brim; as no tuberculous pyuria issued into the bladder, there was no real swelling or change at the ureteric orifice.

CHAPTER XI.

THE VALUE OF URETERIC MEATOSCOPY IN CASES OF CHRONIC PAIN EXPERIENCED AT OR NEAR THE REGION OF THE APPENDIX VERMIFORMIS.

I MUST omit many interesting points in connection with ureteric meatoscopy, for neither time nor space permits me to deal with them. I cannot, however, leave the subject without drawing especial attention to a very important pitfall—that of attributing all pain complained of in the region of the appendix to disease of that body. It is held—and more especially since appendicitis has become fashionable with us—that any marked pain or tenderness in this region with co-existing derangement of the bowel should raise the question of operation upon the appendix. This is a fertile source of error. I believe there are few consultants who have not made the mistake of diagnosing right renal or ureteric disease as appendicitis, and the difficulty is acknowledged by several.* I do not suggest that I have been blameless in this respect, but I do assert that ureteric meatoscopy has occasionally saved me from this error when no swelling in McBurney's area was present to guide me to a correct interpretation of the case.

As a matter of fact the pain of movable right kidney is

* Mr. Jonathan Hutchinson, jun., on renal stone ('Brit. Med. Journ.,' Oct. 19th, 1901, p. 1134), says he has excised a normal vermiform appendix in a young man for attacks of what he and two physicians mistook for appendicitis. Ten days after the operation he passed a small renal calculus.

mostly felt at the appendical area, whilst stone descending the right ureter can simulate appendicitis very remarkably. In many, the use of the cystoscope will show changes of the right ureteric orifice and establish the true diagnosis. The characteristic changes chiefly seen are those of dilated renal pelvis, or of pyelitis, or of descending stone. The features of these have been already described and illustrated in the foregoing pages.

I could bring forward a fair number of cases, but I will select three or four from the practice of well-known operators in large hospitals.

CASE 1.—Mr. J—, æt. 27 (O. Per., vol. v, 164), was sent to me for treatment of a cystitis supposed to have originated after an operation for the appendix.

His history was that eighteen months ago he had influenza and then appendicitis, pain being felt in the usual place and in the right loin. He was operated upon, and that body removed during a "quiescent" stage. But exactly the same symptoms recurred, each attack becoming more severe. Finally the right kidney swelled until it became a visible tumour, a large quantity of pus was passed naturally, and all the pain ceased. Cystitis now supervened, and he came under my care.

Cystoscopy.—The bladder was very slightly inflamed. The right ureteric orifice was large and open, its edge was ulcerated; a small oval stone like a small egg lay on the bladder base; the left ureteric orifice was healthy. I evacuated the calculus.

Obviously the case had been one of descending right-sided calculus.

CASE 2 (Vol. Pr., 58, 54).—A lady, æt. 22, was prematurely confined of her second child, and suffered from retention and cystitis. In convalescing she was seized by a violent pain in the region of the appendix, her temperature rose to 104°, and there was vomiting, constipation, and other symptoms incidental to fever. An operation was hurriedly performed and the appendix removed. All the stitches suppurated, and healing was greatly delayed. The convalescence from the operation was marked by recurrent attacks of fever, vomiting, right renal pain,—in fact, by all the symptoms which were stated to have necessitated the appendicectomy. A fresh practitioner diagnosed right renal suppuration, which was

confirmed by a fresh consultant. I was asked to cystoscope. Right-sided pyelitis was obviously present, and the case was so urgent that the right kidney was opened, although the temperature was 104°, and a small phosphatic stone removed. There was an uninterrupted recovery.

CASE 3.—Male patient presented himself with obvious right renal tuberculosis, with deposits in the right epididymis and right lobe of prostate. He had a long fresh scar in the appendix region. The operation, which he asserted had been for the removal of the appendix, pain having been complained of in that region with fever and constipation, had not made any change in his symptoms, or caused him the slightest relief.

CASE 4 (Pr. vol. 42, 4).—I was called to see a lady with a very large abscess in her right kidney. A long scar crossed the appendix region, and I learnt that that body had been removed a few weeks previously for supposed appendicitis. The kidney was removed.

APPENDIX.

CONTRIBUTIONS TO THE DIAGNOSIS OF SURGICAL DISEASES OF THE KIDNEY.*

By Prof. Alexander v. Korányi.

It is my intention to describe, in the following short communication, a method which admits of the possibility of recognising the diseased condition of the "other kidney" in surgical diseases of the kidney, even in those cases in which the urine of the other kidney is qualitatively normal.

I propose to report fully on my experience in another place.

1. *Basis of the Method.*—Blood possesses a freezing-point "depression" of 0·56° (C.). Fifteen grammes of blood suffices for the determination, and the method can be carried out within a quarter of an hour. For this purpose I employ the Beckmann's apparatus, which is conveniently provided with a thermometer, the zero of which cannot be altered.

The constancy of the freezing-point depression of blood depends on the balancing of various processes, which influence it inversely.

In metabolism large molecules are split up into smaller

* The investigations dealt with here have been published in the Hungarian language since 1894 in numerous articles. A recapitulation in German appeared in the 'Zeitschrift für klin. Medicin,' vol. xxxiii, Nos. 1 and 2; a few odd contributions appeared in the 'Ungarischen med. Presse,' 1898, Nos. 13—15.

ones. In consequence of this the contents of the juices of the tissues and of blood increase in solid molecules, which manifests itself in a corresponding increase of the freezing-point depression, as I have proved. The kidneys act in a reverse direction, in that they free the body from its excess of dissolved molecules.

If the activity of the kidneys decreases, the action of metabolism and of evaporation increases, and the freezing-point depression (called "δ" in the following) increases. It follows from this that renal insufficiency can be recognised by the abnormal size of δ. I must state that, after having carried out examinations continuously for five years, there is no one method which is capable of discovering such small degrees of renal insufficiency as the determination of δ.

As has been proved in another place by the examinations of Kovács, an insufficient respiration also is accompanied by an increase of δ. This increase, however, can be removed by the action of oxygen on the blood, while the same change in insufficiency of the kidneys remains unaltered even after the application of oxygen. It is necessary to determine in each case how much δ can be nfluenced by oxygen. An increase of δ, which is not latered by the treatment of the blood by oxygen, indicates renal insufficiency.

As my experiments on animals show, δ varies in the same degree of renal insufficiency according to the form of nourishment; δ is greatest in starvation, almost as great in albuminous feeding, considerably less in feeding with carbohydrates, and smallest in a mixed diet, in which little albumen and a large quantity of carbohydrates are introduced into the body. In doubtful cases, therefore, δ must be determined while an albuminous diet is employed, in order that smaller degrees of renal insufficiency can be measured.

2. *Diagnostic Value of Renal Insufficiency determined by* δ.—If, in a case of renal disease, $\delta = 0{\cdot}56°$, it follows that the affected kidneys can supply the needs of the

organism fully; in other words, that the kidney disease is fully compensated by the vicarious activity of the healthy portions. I can assert from my numerous experiments on animals and human beings that a single healthy kidney suffices to maintain δ at 0·56°. An increase of δ therefore (something over 0·57°—0·58°) indicates that both kidneys functionate insufficiently.

Insufficient function of both kidneys can occur in cases in which both kidneys appear anatomically healthy, but when their activity is impaired by a general (heart disease) or local disturbance of circulation. The latter condition can be caused by a considerable heightening of the intra-abdominal pressure. Thus an increase of δ can nearly always be ascertained with large tumours of the abdominal cavity, with tumours of the pancreas, spleen, liver, the retro-peritoneal lymphatic glands, etc., and, naturally also, with larger tumours of one kidney even when the other kidney is healthy. In the case of an enormous pyonephrosis δ was 0·68°, but after extirpation it was 0·57°.

It is of particular importance that one-sided renal pain causes renal insufficiency, probably by means of the production of a reflex ischæmia of both kidneys. During an attack of one-sided renal colic δ was 0·76°, during a less severe attack δ was 0·68°, and in the interval 0·57°. In a case of right-sided renal neoplasm with small tumour, associated with slight but continuous pain, δ was 0·69°; after the pain was relieved δ was 0·58°.

From what has been said one must distinguish sharply between renal insufficiency generally and bilateral renal disease. Renal insufficiency can exist when there are large abdominal tumours with healthy kidneys, when there are large one-sided renal tumours in spite of the other kidney being healthy, as well as with every one-sided painful renal affection. From the existence of renal insufficiency the diseased condition of the other kidney can only be inferred when no large growths and no renal pain are present. But then the deduction is certain.

During the early period of my investigations, when I did not yet venture to formulate this maxim with sufficient confidence, I was forced to be convinced of the truth of this by a sad case. The patient suffered from a profuse hæmaturia. A renal tumour was found on the left side, which was scarcely palpable; $\delta = 1{\cdot}02°$. After nephrectomy a benign papilloma was found in the renal pelvis. Six months later hæmaturia again appeared and villous shreds were found in the urine, which proved that the only kidney, which had become painful by this time, was also the site of a papilloma.

In cases, therefore, when no large kidney growth is present which can cause renal insufficiency mechanically, and when there is no renal pain which can cause it reflexly, a renal insufficiency recognised by δ proves that the other kidney is also diseased. This disease, naturally, need not be anatomically recognisable. It can be produced simply by a deficiency of reserve power which is required for the doubled activity by the vicariation for the anatomically diseased kidney.

3. I have briefly reported (l. c.) the uses to which the determination of the freezing-point depression of the urine (Δ) under various circumstances can be put. Only the following short remarks will be quoted now. Δ generally fluctuates between $1{\cdot}2°$ and $2{\cdot}2°$. In affections of the renal epithelium Δ approaches the freezing-point of the blood or equals it. Healthy kidneys adapt themselves, however, within the wide limits of the intake of water, so that Δ can vary between $0{\cdot}10°$ and over $3°$ in extreme cases. Therefore a small depression of the freezing-point can only be regarded as pathological when it exists in spite of a moderate intake of water, and thus proves the incapacity of the kidneys to secrete a concentrated urine. If under such circumstances Δ is less than $1°$, and no severe anæmia is present which could explain this circumstance (l. c.), one must assume that disease of both kidneys exists. In such a case nephrectomy must cause death (l. c.).

4. The determination of the freezing-point depression, the NaCl value, and in one case the urea value of fluids gained through fistulæ from the pelvis of the kidney produced by nephrotomy have led me to form opinions which I will not leave unmentioned here. In the five cases in which I had the opportunity of making such investigations the results were always the same. The secretion was like a simple transudation in every respect ($\Delta = \delta$, NaCl value also equal or a little greater than that of blood, etc.), from which follows that all the cases examined by me resulted in a disintegration of the nephrotomised kidneys. All examinations were made half to two years after the nephrotomy.

It would be a very important point to decide whether this is the rule or exception. If it turned out that every nephrotomy healing up with a fistula led to the loss of the specific activity of the kidneys, the same weight would have to be laid on the condition of the other kidney with such operations as with nephrectomy.

HISTORY NOTES OF FIFTY CASES OF PROVED URINARY TUBERCULOSIS, WITH CYSTOSCOPIC FINDINGS.

? DESCENDING CHANGES.

CLASS A.

"Golf-holed" Ureteric Orifices.

CASE 1.—Mrs. G—, æt. 24 (O. Per., vol. vi, 362). Six months bladder symptoms (frequency, pain, blood). Fourteen days right renal pain. Tubercle bacilli in urine.

Cystoscopy (April 20th, 1903).—Right ureteric orifice (golf-holed) the size of a penholder in circumference—funnelled, very red in colour—with distinct tubercle near it. Left ureter clean, bright, and healthy; bladder contracted; posterior wall surface ulceration.

Mem.—Had had vesical irrigation.

Cystoscopy (June 26th, 1903, after two courses of Koch's injection).—Right side of ureteric bar reddened, becoming almost scarlet with extravasated blood towards the right ureteric orifice, which is seen as an irregular hole with a distinct ulcerated edge; discrete grey tubercle near it; circumureteric area deeply red. Left ureteric orifice bright and healthy; posterior wall has pinched-up red rugæ.

CASE 3.—Herbert S—, æt. 24 (O. Per., vol. vi, 328) (Dr. F. J. Smith, March 5th, 1903). Nine weeks ago pain in perinæum on cycling, then F. Pressure on pubes causes pricking perinæal pain. F.: one to two hours. Mother died of phthisis. *No renal* symptoms. *Urine:* tubercle bacilli in numbers, pus.

Cystoscopy.—A golf-holed right ureteric orifice. Miliary tubercle round left orifice; a thick left vesicula seminalis; a red-edged ulcer on posterior wall.

CASE 8.—H. R— (O. Per., vol. vi, 227), November 10th, 1902. Symptoms of cystitis only. Tubercle bacilli in urine numerous. Testes free.

Cystoscopy.—Left ureteric bar very red, and on its posterior edge, away from its usual position, was a wide-open, sharply-cut hole with a film of muco-pus hanging to it. Right ureteric orifice reddened, but not more than the trigone. Miliary tubercle in patches on th postero-superior wall; no distinct open ulcer.

CASE 16.—R—, æt. 28 (O. Per., vol. v, 445) (Dr. Martin Richardson, Kirkstall, Alverstoke). *Left renal pain* 2 months. Now it has gone to tip of penis. F.: N. and D. = 4 hrs. More frequency on exercise. Left epididymal knot. Urine 1018, albumen, pus, tubercle bacilli.

Cystoscopy.—Bladder inflamed and red. Left ureteric orifice holed, sharp-cut, obliquely drawn out of place.

Mem.—There are degrees of "dragging out," from a slight change in position in the bar itself to an absolute disappearance under a fold of the lateral wall.

CASE 19.—Mrs. S—, æt. 44 (O. Per., vol. v, 420; Pr., vol. li, 89). Pain in left renal for some years. Pain in left ovarian region for three years, which was relieved by removal of an internal polypus. Bladder symptoms now, frequency and pain. If she lies on the right side she has a little pain, but it stops if she turns on the left. Tubercle bacilli in urine; many examinations.

Cystoscopy (June, 1901).—Left ureteric orifice a hole; edge frayed in front. Circumureteric area fretted and red; epithelium lost, generally over walls; here and there are distinct erosions. Right ureteric orifice a trifle swollen.

Continuous courses of Koch's tuberculin for two years. Sept., 1903: can sleep either side; great improvement; no tubercle bacilli in urine. Reports herself "well in every respect."

CASE 20.—Miss K—, æt. 24 (O. Per., vol. v, 396; Pr., 53, 67). Eighteen months ago pain in urethra and frequency. Never pain in the loins.

She had been washed out, and the temperature had oscillated between 101° and 98·6°. Tubercle bacilli in urine.

Cystoscopy (April 21st, 1901).—Left ureteric orifice: a sharply cut hole flush with the mucous membrane; behind it a blood-edged ulcer. Right ureteric orifice swollen; lips upraised, patulous; streaks of pus issuing. This latter was diagnosed as indicating

ascending, septic, non-tuberculous pyelitis, crippling the right kidney, and the case was deemed inoperative. Rest of bladder covered with denuded patches bordering on islands of soddened white epithelium.

Large right renal tumour formed at Christmas, 1901, which suddenly discharged a pint of pus and then disappeared, after which tuberculous meningitis set in at once, and she died in seven days.

CASE 25.—R. C—, æt. 30 (O. Per., vol. v, 255). Five weeks' history. Pain on micturition all along penis, increased at end of act; also a gnawing pain at end of penis. Squeezes out a few drops of blood at end of urination. F.: 1—2 hrs. D., 1 hr. N. Tubercle bacilli in urine, 1030, acid albumen, pus.

Cystoscopy.—Right limb of trigone thickened. Right ureteric orifice: lips swollen and puffed out with œdema, surrounding a very small irregular black opening. Left ureter: lips slightly swollen.

CASE 27.—Miss L—, of Ascot, æt. 24 (O. Per., vol. v, 53, 55). Seen March, 1900: for twelve months she has had supra-pubic pain on lying down and stooping—better when walking about. F.: 10 mins. D., ½ hr. N. Some pain in left loin occasionally. Mother died of phthisis. Tubercle bacilli in urine in large numbers.

Cystoscopy.—Left ureteric orifice a golf hole—not drawn out. Left wall posteriorly was covered with small red pinchings up of mucous membrane, surface erosions, and little points of hæmorrhages. Right ureteric orifice was healthy.

Operation.—Left kidney (large) appeared quite healthy. Ureter looked quite healthy; no shot on surface. Upper pole dimpled, and on cutting it open it was seen to be a tuberculous cavity. Nephrectomy; pelvis soft; two excavated tuberculous cavities at the upper and lower calyces. Recovered.

CASE 29.—E. M—, æt. 34 (O. Per., vol. v, 229; O. P., xviii, 116). Twelve months' history of pain at right costo-vertebral angle, sharp. Two months' history of frequency and pain on urination, from perinæum to penis, increased by exercise. F.: 2 hrs. D., 2 hrs. N. Tubercle bacilli in urine.

Cystoscopy.—Right ureteric orifice sharp-edged, narrowed, golf-holed; not apparently pulled out; around the opening were deep red folds; superficial ulceration on posterior wall, with adherent muco-phosphatic deposits. Left ureteric orifice healthy.

Nephrectomy.—Kidney obviously tuberculous. The mucous membrane of ureter swollen, but not ulcerated nor obviously tuberculous;

it was friable and pale; microscopically it did not show giant-cell systems.

CASE 34.—Mrs. W—, æt. 32 (O. Per., vol. iv, 83, 334; Pr., xxiii, 11) (Dr. White of Nailsham). History of backache. Right kidney a little tender. Tubercle bacilli in urine, also calcic oxalate.

Cystoscopy (February 4th, 1898).—Right ureteric orifice a small fine golf-hole. Left ureteric orifice a slit; posterior wall distinctly denuded of epithelium and reddened by ulceration.

Courses of Koch injections.

Cystoscopy (March 14th, 1899).—Bladder capacity small, but urine clear and mucous membrane very healthy. Both ureters were small and well-marked holes. A single red patch on posterior wall as if the "last kick" of an ulcer.

March, 1900.—Same, except white scar on the posterior wall low down with radiating ribs.

July, 1903.—Well.

CASE 35.—F—, æt. 26 (O. Per., vol. iv, 366, 536; Pr., vol. 40, 42) Two months ago sudden pain at peno-scrotal bend in micturition, passed a drop or two of blood, then a pint of clot and blood; great frequency. Many tubercle bacilli in urine. May, 1899.

Cystoscopy (May, 1899).—Both ureteric orifices reddened; areas around granular and inflamed. Left ureteric orifice looked especially involved. Free from all symptoms.

Cystoscopy (February 3rd, 1900).—Right ureteric orifice golf-holed; ? a little displaced. Left ureteric orifice not noticeably changed. Post-trigonal area covered with red extravasations and superficial ulcers. No renal symptoms.

CASE 36.—Mrs. R— (O. Per., vol. iii, 392, 397; iv, 371, Pr., vol. 20, 23), November, 1892.—Over-held water in a train, and ever since a burning in her urethra after urination; also a constant desire to relieve herself. A month later she suddenly passed bright blood. Since then a "sore" in her urethra. 1893.—A dragging pain in left loin, which extended to the bladder; relieved by a ring pessary.

Mem.—Sometimes when she is sleeping on her right side and turns on to her left she gets the most indescribable burning at the left side of the bladder, and up to the pelvic brim. She has to turn back to the right side. With champagne or any indiscretion in diet this burning is worse. If she does not secrete urine and her bladder gets "dry" the burning is dreadful, like hot lead.

Cystoscopy (January 15th, 1897).—Left ureteric orifice: a large golf-hole; edge inlaid with a milk-white material; not displaced. Right ureter healthy.

Operation.—Kidney very adherent; no perinephric hardness; surface quite red and healthy, dimpled here and there on pressure of the finger. On cutting into cortex the apex was healthy, but the rest was hollowed out into small cavities lined with pyogenic membrane, some containing small flat black phosphatic crusts. In one cavity the water was clean, but in most it was murky with pus. Largest cavity in the lower pole. Ureter thin and narrow. Microscopy revealed tubercle bacilli in groups in the sloughy membrane of the eroded calyces.

Cystoscopy (May, 1899).—Bladder contracted but apparently healthy. Left ureteric orifice unchanged. An irregular open golf-hole. Frequency still present, and burning at left side of bladder.

February, 1900.—Can lie on left side. Still great frequency.

June, 1903.—In good health. Still frequent, but less so.

CASE 37.—Leslie Y— (O. Per., vol. iv, 394, Pr., vol. 41, 26). Symptoms of cystitis only. No pain in right side. Tubercle bacilli in urine.

Cystoscopy (June, 1899).—Right ureteric orifice an uneven open hole; depressed flakes of pus issuing. Left ureteric orifice not changed.

October, 1900.—Left epididymis swelled.

CASE 40.—Mrs. P—, æt. 33 (O. Per., vol. iii, 456, Pr., vol. 29, 80). When six weeks pregnant (December, 1896) a sudden frequency. In a fortnight it was so bad as to be thirty times at night, and every fifteen minutes in day. Pain in urethra before and after act. No pain or tenderness in left kidney. Forced to sleep on right, because of irritability of bladder if she lies on the left side. Right kidney a little movable, the left not felt. Tubercle bacilli in urine in fairly large numbers.

Cystoscopy (May 21st, 1897).—Bladder held 6 oz. Left ureteric orifice displaced a little, and golf-holed, with pus particles in efflux. The area around it reddened and superficially eroded. The right ureteric orifice a healthy slit.

June, 1899.—Much stouter. Frequency still marked; ¾ hr. D. and N. Has pain in the left kidney just before urination. The area of pain can be covered by the hand in the loin. Left kidney is large, not tender. She cannot sleep on her left because of pain in

her left kidney, as if urine collected and fretted a sore in her kidney. Declined operation.

Mem.—Here we see changes in ureter have no connection with the period of time in which renal symptoms have been noted, or in the presence of pain in the kidney.

CASE 49.—Alf. T—, æt. 25 (O. Per., vol. iv, 313). Attacks of severe pain at end of penis and supra-pubic region, which is worse after micturition. F.: 2 hrs. D., 3 or 4 hrs. N. Blood at end of act. Small nodule in right prostate. No renal swelling or tenderness. Illness had lasted ten days, onset sudden and severe. No tubercle bacilli in urine.

Cystoscopy.—Barely held 2½ oz. Right ureteric orifice a golf-hole, left a slit. Mucous membrane of a red succulent aspect. Here and there white necrotic films behind each ureteric orifice.

CLASS B.

"Retracted" or "Displaced" Ureteric Orifices.

CASE 2.—Mrs. M—, æt. 35 (O. Per., vol. vi, 328) (Dr. Mitchell Bruce). Pain five years ago along the right haunch, renal pain? Tubercle bacilli in urine, ·75 per cent. urea. A large adherent right kidney.

Cystoscopy.—Right ureteric orifice retracted and funnelled. Left ureter—a red-edged orifice—with two small ulcers in its neighbourhood.

CASE 11.— . B—, æt. 25 (O. Per., vol. vi, 196). Ill for eight or nine years. Pain in left kidney sharp and shooting into groin and testes and down leg (left). Tubercle bacilli in urine, and phosphatic ulcer caps or crusts; 1020, acid; no albumen. Left testis tuberculous; the right had been removed. Left nephrotomy had been performed elsewhere and pus removed. F.: D. 1½ hrs.; N. 2—3 hrs. no real lumbar pain after the nephrotomy.

Cystoscopy (September 26th, 1902).—Left ureteric orifice pulled out of place; indistinguishable; obviously buried in the funnel. Right ureteric orifice open, gaping, and thick-lipped. On the right side of posterior wall there were a quantity of adherent phosphatic

crusts and open ulcerations. Left lower wall completely covered with whitish phosphatic deposit.

CASE 13.—Miss Madge R—, æt. 38 (O. Per., vol. vi, Pr., vol. 59, 3) (Dr. Waddelow Smith). Three years right renal pain and swelling. Two years bladder symptoms. Pain, frequency, blood. Right kidney enlarged. There is a history of passing a uratic stone from the left kidney one month before the cystoscopy. Tubercle bacilli in considerable numbers.

Cystoscopy (June 2nd, 1902).—Right ureteric orifice pulled out of place; surrounded by minute myxomatous-looking glands. Left ureter: elongated sulcus and a suspicious ulcer of small size behind it. Bladder congested.

June, 1903.—Fat and well. Has put on a stone in weight.

CASE 15.—Miss M—, æt. 20 (O. Per., vol. v, 16; Pr., 45, 47). Three years pain in right side, sharp, lasting a few hours, then leaving for weeks. One year later an uneasy feeling in urethra and frequency. Sleeps right side. No renal tumour. Tubercle bacilli in urine. A fair amount of pus, a few red blood discs and calcic oxalate crystals. No renal cells.

Cystoscopy.—Right ureteric orifice displaced, with patches of extravasation around: the other ureteric orifice was healthy.

Operation.—Kidney retracted under ribs high up—attached at upper and lower poles; capsule stripped easily. Ureter not thickened at kidney, but the pelvis was eroded with tuberculous ulceration, and there were signs of old interstitial nephritis.

CASE 24.—Miss McP—, æt. 40 (O. Per., vol. v, 353, Pr., vol. 52, 75) (Dr. John Thomson, of Edinburgh).

History (May, 1896).—Pain in right iliac region, accompanied by vomiting and vesical tenesmus. In 1897 right kidney found displaced, and fixed by an operating surgeon.

Cystoscopy (April 22nd, 1901).—Right ureteric orifice and bar pulled out under a fold of right lateral wall, the edge of the fold of mucous membrane being warty and deep red, like the edge of a tongue. Small red areas all over posterior wall of submucous extravasation. Left ureteric orifice open; slightly swollen, but not enlarged. Did the fixation of the right kidney increase the drag out of the right ureter? Right kidney removed.

October 21st, 1901.—Right ureteric orifice visible in its proper place, but blurred. Trigone speckled red, as if a patch of chronic

granular urethritis. Left ureter: lips swollen, but not enlarged. Posterior wall a few patches of red submucous extravasation.

March, 1903,—"In rude health; urine normal." Note from Dr. John Thomson.

CASE 28.—Mrs. L—, æt. 24 (O. Per., vol. iv, 189; vol. v, 109) (Dr. Fowlie, of Singapore),

History (July, 1896).—Pain in the right side over front of kidney, sudden onset. She had an inclination to urinate, but was unable to do so. After an hour's straining she succeeded; the sample contained traces of albumen. August, 1896.—Married. December, 1896.—Pain on urination, also a dull pain in right side. February, 1897.—Frequency and pain in urination, pain in bladder in cortex. Could not lie on the right side because of pain in bladder; can sleep on left side.

Cystoscopy (July, 1898).—Right ureteric orifice like an open miniature crater, edges very red, and tucked in as if a finger outside the bladder was drawing the ureter up into the loin. A pus efflux. Left ureteric orifice healthy. Bladder held 12 oz. Patches of red infiltration on posterior wall.

Nephrectomy.—Typically tuberculous kidney; healed.

CASE 41.—J. L—, æt. 27 (O. P., vol. v, 98), was admitted under a colleague with incontinence of urine. He had a renal tumour of the right side; very painful at one spot. There was a history of renal colic. It was opened, a quantity of pus evacuated, and the patient died.

On post-mortem I found the right kidney was transformed in a multilocular sac of tuberculous material. The left ureter, from the hilum of the kidney to the bladder, was greatly thickened, resembling a thick thumb; its small canal was eroded here and there with ulcers and obviously tuberculous, especially at the upper third, its canal being nearly occluded by dense clumps of caseous material. Left kidney large, congested, but normal. Prostate on right side had two masses, the size of horse-beans, of caseous material. On opening the bladder fine miliary tubercle was scattered over the bladder, interspersed with small yellow clumps of crude tubercle.

I noted—(1) The interureteric bar was very thickened. (2) The right ureter at its junction with the bladder was embedded in a mass of indurated inflammatory tissue; its mouth, as seen in the bladder, was drawn right out of its usual place quarter of an inch. (3) That the muscle wall of the right side was thickened in the neighbourhood of the ureteric track.

CASE 42 (May 27th, 1886).—On opening the bladder of a patient dying in the London Hospital, I found a large ulcer extending over the entire anterior and left lateral wall. The base of the ulcer was merely eroded, and tubercle-strewn muscle. The left ureteric orifice was eaten away, and the opening was dragged away from its position. Right orifice fairly healthy. The left kidney was small; it was hollowed out into a series of tuberculous cavities, varying from a walnut in size to a small egg, containing thick cheesy stuff. Right kidney large, much adherence; in a state of suppurative nephritis, and the pelvis distinctly tuberculous. Miliary tubercle in lung.

CASE 48.—R. D—, æt. 26 (Dr. Shalders Miller, of Windsor). Seven years ago left renal pain coming on gradually. Five years penile pain, hæmaturia, and frequency.

Cystoscopy (May 26th, 1888).—Left ureteric orifice like a retracted nipple, being buried in a heap of purple mucous membrane. To the left and behind it is a large crateriform ulcer, the edges of which are jagged, everted, swollen, and gelatinous. Posterior wall had several pinched-up reddened patches.

CLASS C.

"Choked" Ureteric Orifices.

CASE 17.—J. C. H—, æt. 24 (O. Per., vol. v, 430) (Dr. Pollinger Eldred). Twelve months ago a sudden attack of left renal pain when at work, coming on at the costo-vertebral angle; was not sick; it lasted an hour, then free; water thick for eight weeks. This pain has recurred. The frequency: 2—3 hrs. D., 2—3 hrs. N. No pain in urethra, but a hectic temperature and acid pyuria. Tubercle bacilli not found on one examination; 1020, albumen.

Cystoscopy (September 13th, 1901).—Left ureteric orifice was everted, the everted lip being ulcerated. The circumureteric area was ulcerated or covered with innumerable finger-shaped processes of œdematous tissue. Right ureteric orifice healthy. Right side of posterior wall behind ureteric opening was ulcerated like a target scar.

Operation.—Left *kidney* looked quite healthy, but the upper end was adherent. The pelvis was dilated; its wall was thick and gelatinous. There was much water and rice-pudding or clotted-milk stuff in the pelvis. The kidney was extensively hollowed out by tuberculous ulceration, especially so in the upper calyx. Nephrectomy.

CASE 18.—Alb. S—, æt. 37 (O. Per., vol. v, 478, 481; O. P., vol. xviii, 196). Two years ago acute pain in right kidney region; began in costo-vertebral angle; almost doubled him up. Not sick, but felt so. A fixed pain; no radiation. Lasted two or three days. Three weeks later blood for fourteen days and great frequency, every ten minutes now. F.: N. and D. 1 hr. Urine quite clear. Prostate: right side healthy, left lobe shotty, hardish, and enlarged. Double epididymal deposit.

Cystoscopy (November 14th, 1901).—Right ureteric orifice small, seen badly, and contracted red; surrounding area blotched with blood; not pulled out. Behind it were scars of old ulcers. *Left* ureter healthy, elongated.

Operation.—Right kidney *movable*, atrophic, white, only a mass of cheesy material. A vas deferens-sized and shaped ureter, which had *no* lumen. A small psoas abscess.

Mem.—The psoas had affected the right side of the bladder, and this had healed, and I suggest the kidney had leaked (? into psoas.)

CASE 39.—Mrs. B—, æt. 21 (O. Per., vol. iv, 463, 471; Pr., vol. 42, 99). Three years ago—September, 1896, severe left renal colic, pains commencing over front of organ. These recurred twice or thrice a week, always with pus in the urine. A movable right kidney. Tubercle bacilli in urine.

Cystoscopy (October, 1899).—Left ureteric orifice: a distinct visible thickening of the left ureteric bar, on it is seen the small narrowed opening of the left ureter, with a little of the red mucous membrane of the ureter prolapsing like the mucous membrane caruncled at the orifice of the female urethra. Right ureteric orifice healthy. Bladder healthy, though it is three years ago since the renal colic commenced. Veins of post-vaginal space large and markedly full.

Operation.—Left kidney small and adherent. One small nodule of tubercle on upper pole. Pelvis extensively eaten out into ulcerated tuberculous cavities. Ureter thick like a huge lead pencil, and at its orifice with the pelvic cavity a thick layer of crude tubercle. "The surface of the kidney is coarsely nodular, but the capsule is

not adherent. On section there is caseous pyelitis and numerous breaking-down foci in the cortex of the kidney. Microscopical examination shows an abundance of grey and caseous tubercles in the cortical substance, and much evidence of old interstitial nephritis, with fibroid glomeruli and atrophy of the glandular tubules."—Targett.

Married September, 1900. Became pregnant. Premature delivery at eight months.

Mem.—Here is a thickened and ureteric orifice not dragged out. Tuberculous urine was issuing from it, and yet the bladder looked healthy.

CASE 46.—Patrick D—, æt. 44 (O. P., vol. xvi, 430). Three years ago pain in left inguinal region, running up to left kidney; it lasted four hours. These attacks occur at intervals of a few months. Five months ago bladder symptoms. Cannot lie on left side. *No* renal tumour. Tubercle bacilli in urine.

Cystoscopy (February 11th, 1897).—Bladder contracted to 6 oz. Right ureteric orifice circular in outline, a dull grey. The circum-ureteric area blotched with extravasations. Left ureteric orifice a red slit. The adjacent trigone also red. A red keloid-like scar on posterior wall, low down.

Mem.—Started with left renal pain.

CLASS D.

Massive Œdema of the Ureteric Orifice.

CASE 22.—C—, æt. 30 (O. Per., vol. v, 375). Appendix removed by an operating surgeon for pain at McBurney's point and in back without relief. Twelve years ago right epididymitis and abscess. Prostate healthy.

Cystoscopy.—Bladder contained 4 oz. with difficulty. Right ureteric orifice enormously puffed with œdema. Left ureteric orifice ulcerated on lower lip; rest of bladder scarred and ulcerated.

CASE 23.—John H—, æt. 38 (O. Per., vol. v, 362; xviii, 172). Two years pain in right kidney. Attacks almost weekly; it ran down to groin and penis, and it was extreme at times. Passed blood two

months ago. No night frequency; exercise has no effect. Tubercle bacilli: fair number in urine.

Cystoscopy (May 3rd, 1901).—Right ureteric orifice and area puffed out into an enormous œdematous swelling of a light pink colour, looking like a papilloma, but obviously œdematous. After a weeks' course of urotropin swelling *seemed* flatter. Lost sight of case.

CASE 30.—W. L. T—, æt. 19 (O. Per., vol. iv, 529, Pr., vol. 44, 68) (Dr. Weakley). Twelve months on and off occasional pain in right side, not severe; no nausea; no other symptom. Urine: tubercle bacilli in small numbers; small amount of pus; minute ill-formed crystals of calcic oxalate; no casts; a few renal pelvic cells; trace of albumen.

Cystoscopy (January, 1900).—Right ureteric orifice and immediate area puffed up into a large œdematous swelling, translucent and veined. Left ureteric orifice healthy. Two courses of Koch's injections. Much flattening of ureteric swelling; a darker colour. reports himself well.

September, 1902.—Right ureteric orifice flat; nothing abnormal. Left ureteric orifice normal. A tuberculous deposit in the right prostate. No symptoms.

? ASCENDING CHANGES.

CLASS E.

Ureteric Orifice lost in a Uniform Vivid Red Extravasation.

CASE 21.—Miss Mabel B—, æt. 23 (Pr., vol. 33, 92). Father died of phthisis. Tubercle bacilli in urine. Thirst for years. *Ill* three years; commenced with cystitis obviously. Free for one and a half years; suffered no pain. One year and nine months ago gradual return of pain and frequency, latterly aching in right kidney.

Cystoscopy (March, 1898).—Ulceration of bladder and some pyelitis (accurate notes lent, and not returned).

June 9th, 1901.—Right kidney movable and feelable.

Cystoscopy.—Greater part healthy; left ureter healthy. Right

ureteric orifice not seen well; lost in general redness. Outside and behind right ureter is a long bean-shaped ulcer, chronic, with a fine granular base and an indurated edge.

She cannot lie on that side, it causes her pain and frequency; she must lie on the left She has worn her clothes out over the front by pressing on the right side of her bladder. She looks well, and is well, and can hold her water from breakfast until lunch, but she always has pain supra-pubically. Right kidney aches much; cannot lie a minute on the right side. If she jerks herself or shakes herself when she is full she feels the pain at *once* at the right side of bladder.

CASE 31.—Miss G—, æt. 25 (O. Per., vol. iv, 244). Passed a quantity of blood in spring, 1897, after playing tennis; dark red; no pain; no frequency. Since then on and off a little blood at end of micturition. Tubercle bacilli in urine.

Cystoscopy (November, 1898).—Right ureteric orifice of a deep red, congested and inflamed. Left ureteric orifice healthy, ejecting healthy urine. Posterior wall: peeling epithelium, eroded here and there.

CASE 44.—J. B—, æt. 40 (Pr. vol., 30, 50). Six months frequency, then urethral pain on micturition, then hæmaturial attack. Right kidney feelable; no pain in it. Tubercle bacilli in urine.

Cystoscopy (July, 1897).—Held 14 oz. *Right ureteric area:* blood red and ulcerated.

CASE 45.—Mrs. V—, æt. 47 (O. Per., vol. vi, 187; Pr. vol., 61, 12). Rib scars of old tubercle are present.

Twenty years ago used to have pain which commenced in left side. Then it came along the ureter to the navel. She threw herself about, drank hot water, and it left in half-hour, and after pain was gone she passed a quantity of water. (Kink in ureter?) Free after childbirth. Same pain came on again at forty. Two years ago urethral pain with urine like a knife running into her. Capsule relieved for a month or two, then it returned. It now hurts her to walk, and she feels she must strain her inside out.

Cystoscopy (September 20th, 1902).—Left ureteric orifice could not be seen; its area was scarlet with submucous hæmorrhage. Entire left half of bladder was white and scarred.

Nephrectomy.—A tuberculous left renal multilocular sac. Pedicle embedded in tough fat. The ureter was thick like a giant vas. I dissected it out.

Mem.—Tubercle was not found.

CASE 47.—A. J. C—, æt. 14 (vol. xv, 200). Six months' bladder symptoms. Last two days pain in the region of the right kidney, relieved by free action of the bowel. No renal tumour. Tubercle bacilli in urine.

Cystoscopy.—Bladder held three ounces. Right side of trigone and right ureteric deeply red. Ulcerated posterior wall.

CASE 50.—Charles M—, æt. 32 (O. Per., vol. v, 282). (Sent by C. J. Griffith, of Haywards Heath). Tubercle bacilli in urine, large numbers.

Symptoms.—Pain at root of penis during micturition for six years, increased by exercise. Five attacks of hæmaturia during three years. F.: D. and N. ½ hr.

Cystoscopy (January 29th, 1901).—Bladder held 4 oz. Right ureter surrounded by deep red extravasation, orifice doubtfully involved. Left ureteric orifice healthy. Posterior wall covered with definite ulceration and red pinched-up rugæ.

CLASS F.

Unclassified.

CASE 7.—H. A. M—, æt. 36 (O. Per., vol. vi, 235; Pr., vol. 62, 69). (Dr. Noad.) Bladder symptoms for twelve years, blood at finish of coition. (? Tuberculosis of vesicle or prostate.) Frequency, pus, and blood; the last frequently after sexual intercourse. Tubercle bacilli in urine, many. *Prostate* small, hard, a shotty feel; a suggestion of a hard deposit under mucous membrane of prostatic urethra.

Cystoscopy (November 15th, 1902).—Greater part of bladder stripped of mucous membrane, especially right side. Right ureteric orifice buried in ulceration, not distinguishable. Left ureteric working and healthy. *No renal pain,* and yet orifice of right ureter buried in ulcer. Abdominal pain. Continuous courses of Koch's injection.

October, 1902.—Better in every way; less frequency; no pain, but still tubercle bacilli in clumps.

CASE 14.—G. W—, æt. 25 (O. Per., vol. vi, 145). Two months ago pain in left loin, passing down to groin, left, and testicle; pain

worse at night. Hæmaturia and frequency. Lately pain at neck of bladder after micturition, and at end of penis during micturition. One week ago passed Oss of pure blood, since then easier. Tubercle bacilli in urine. Left lobe of prostate tuberculous.

Cystoscopy.—Left ureteric orifice not unhealthy. The right ureteric orifice eroded and inflamed. Posterior wall eroded in definite ulcerations of a ringed type. Pain in left loin, and yet ureter healthy. No pain in right, and yet ureter ulcerated!

CASE 4.—Mary F—, æt. 19 (O. Per., vol. vi, 316). Symptoms of cystitis. Four and a half months. No tubercle bacilli found. F.: 29 D., 12 N. Pain before, during, and after micturition. Sleeps on right, if not has pain in left arm. No pain in back. Never blood. Scars side of neck.

Cystoscopy (February 23rd, 1903).—Left ureteric orifice small, irregular in shape, edge ulcerated, a tag of detached mucous membrane flapping about with the issuing ureteric stream. Right ureteric orifice is slightly prolapsed. It was a sleeve with an opening in the termination. Many well-marked tuberculous ulcers, some sloughy-based and rededged.

CASE 26.—Mrs. A— (O. Per., vol. v, 145). Six months' history of irritable bladder. But little pain on her left side, though the ureteric thickening was very marked. *Tubercle bacilli in urine.*

Cystoscopy (September, 1899).—Left ureteric orifice enlarged, irregular, lips ulcerated; a thin pipe streak of pus seen issuing. Left half of bladder much reddened and covered with miliary tubercle, but no extravasation.

Operation.—Kidney very adherent. Ureter thick and blocked by interstitial changes. Pelvis very small, but a cyst on back contained 3 oz. of pus and urine.

Nephrectomy.—Well marked tuberculous erosions of renal pelvis.

Cystoscopy (January, 1900).—Left ureteric orifice obscured by a red, spongy, mottled surface. Splashed over the left postero-lateral wall are hæmorrhage red ulcers.

This case reads to me like primary ureteritis (blocking).

CASE 32.—Mrs. H— (O. Per., vol. iv, 50, 222, 411). (Dr. Foote, Enfield.) Fifteen months pain in bladder after urination; blood and pus. Tubercle bacilli in urine in considerable numbers; pus.

Cystoscopy (November 13th, 1897).—Left ureteric orifice covered with a swelling powdered with lime phosphate. Posterior wall deeply injected; in patches like tuberculous cases.

Operation (September 2nd, 1898).—Removal of a large suppurating tuberculous kidney. Ureter thickened.

July, 1899.—In about one year after nephrectomy left ureteric orifice could not be seen; it was drawn out, the bladder being thrown into deep folds at this spot. Right ureter was holed and reddened, and the mucous membrane was slightly prolapsed; mucous membrane deeply injected around orifice.

CASE 12.—H— (O. Per., vol. vi, 166). Six or seven months stinging pain on micturition at the peno-scrotal junction, and blood-stain threads appeared in urine. Three or four months this pain has become severe, and is much aggravated by exercise. Better on Sundays (*i.e.* when resting). Tubercle bacilli in urine, 1010, acid. F.: D. and N. ½ hr. A knot in left epididymis. A nodule in left vas near vesicle.

Cystoscopy (September 5th, 1902).—Left ureteric orifice was warped, irregular, and surrounded by a thick grey film, whilst above it and to the left was a surface ulceration. Right ureter a little swollen but healthy. Behind it and on the right was a flat, white, scar-like plaque with radiating ribs (? a healed ulcer).

CASE 9.—Miss L—, æt. 43 (vol. vi, 222; Pr., 61, 93). Three years' history of cystitis; now she cannot move without pain; the slightest jolt or jar in the passage causes sharp cutting knife-like pain. Frequency every hour; no renal pain. Tubercle bacilli, considerable numbers.

Cystoscopy.—Bladder contracted and ulcerated in many parts. Left ureteric orifice surrounded by a dull white film. Koch's injections apparently valueless.

CLASS G.

Unaffected.

CASE 5.—Fred. H—, æt. 23 (O. Per., vol. vi, 289). Pain exactly similar to stone. Hæmorrhages. Four and a half years' pain along penis whenever bladder is full, increased by exertion; pain also after micturition. F.: 1 hr. D., 2½ hrs. N. Micturition stops at times. Tubercle bacilli in urine.

Cystoscopy (January 29th, 1903).—Ureteric orifices apparently healthy, but the greater part of the bladder was covered with pinched-up pieces of red mucous membrane and nodulations like wax. I took the latter to be evidence of crude tubercle under the mucous membrane. No deposit in testes or prostate, but the left vesicle feels "full."

CASE 43.—J. B— (O. Per., vol. iv, 58; v, 504). Three or four months frequency; glans pain after micturition; slight persistent supra-pubic pain. Tubercle bacilli in urine. Urine 1006.

Cystoscopy (December 10th, 1897).—Both ureters unaffected; the left, however, was more open. No true ulceration, but a red infiltration on the left side, near the ureteric orifice.

December, 1901.—Great frequency; constant meatal pain, increased by jolting or exercise or muscular exertion. Tubercle bacilli in urine.

Cystoscopy.—Right ureteric orifice a little open and swollen for contiguity with trigone. Left a long furrowed opening with stippling of bar. A scar of an ulcer over the right ureteric orifice. Koch's injections valueless; drained bladder with relief.

CASE 6.—M. C—, æt. 24 (O. Per., vol. vi, 283; Pr. vol., 63, 81). (Dr. Hewer's case.)

History.—Symptomless hæmaturia. Twelve months ago (January, 1902) stream of brightish blood passed for four days without pain or frequency. March, 1902.—Hæmorrhage and clots for a week, like pure blood. No frequency, no pain, no tubercle bacilli in urine, no casts, no indication of any disease (Clin. Research). May, 1902.—Cystoscoped by a "specialist." Nothing wrong. September, 1902.—Bad attack of hæmaturia. December, 1902.—Very bad attack. Discomfort since December (*i. e.* for three weeks) over left kidney in front.

Cystoscopy (January 23rd, 1903).—Both ureters swollen and reddened. The right orifice a little uneven, the left more elongated. Entire posterior wall patched with red tuberculous extravasations and distinct small pea-sized ulcers. Tubercle bacilli are present in urine (Eastes). Has passed a ureteric clot. A pain in a kidney with no visible change in ureteric orifice.

CASE 10.—Mary W—, æt. 35 (O. Per., vol. vi, 204). Scalding pain on urination one year; pain in lower belly increased by movement;

blood in urine increased by movement; bladder tender on pressure. F. often twenty times an hour; pain in left side occasionally. Tubercle bacilli in urine, 1007, much pus.

Cystoscopy (April 12th, 1901).—Typical tuberculous ulceration of posterior wall, showing evidence of some repair, especially one ulcer at right lower wall. Both ureteric orifices healthy, and showing no signs of ascending inflammation. Capacity of bladder 2 oz.

Eighteen months later, October 6th, 1902, *left kidney enlarged.*

Nephrectomy.—Perinephric tissues thickened. Kidney adherent, especially at upper end. Vessels embedded in tough fat. A typical tuberculous kidney. Ureter healthy, but a little swollen.

CASE 33.—Mrs. B— (O. Per., vol. iv, 257; Pr. vol., 37, 83). Nine days right renal pain, but she had had bladder symptoms for five years; thus sudden pain in passing water, which lasted about three weeks, followed by bladder irritability for four years, day, and then night, never blood; constant burning pain in vulva as if period was on. Tubercle bacilli in urine in considerable numbers. No renal tumour felt.

Cystoscopy (November, 1898).—Bladder 4 oz. capacity. Right ureteric orifice open, lips thick, not retracted. Left ureteric orifice healthy; a slit; lips a little swollen by the contiguity of the swollen base.

Operation.—Kidney small, easily dislocated; it felt and looked healthy. Two small tubercle shot at the lower pole. About the middle of anterior surface of the kidney a line of crude tubercle. Cavity of pelvis eroded with tuberculous excavations. The ulcerated cavities contained some phosphatic material. Pelvis wall was thick, and the ureter was thickened. "There are no typical giant-cell systems in the ureter, but the inflammatory tissue in the outer coat of the tube is arranged in well-defined nodules, which is very suggestive of tuberculosis. The mucous membrane of the ureter is not affected."—Targett.

1903.—No bladder trouble, but pain in back and pulsation; ? implication of left kidney.

CASE 38.—H. W—, æt. 25 (O. Per., vol. vi, 445). (Sent by Dr. Wilfred Hadley.) Extreme pain in left kidney for six months. The onset was sudden, coming on after extra hard work as a coal porter. No vomiting, no subsequent hæmaturia. The pain in the left kidney continued dull and aching; it radiated to left front;

was not diminished by lying down. F.: 2½ hrs. D., 2—3 hrs. N. On palpating the left loin the kidney is felt definitely enlarged. Margin rounded. Urine contains no blood, or albumen, or sugar. Sp. gr. 1022, pus cells. Transitional epithelium. No tubercle found. Radiograph shows several indefinite shadows in left kidney.

Nephrectomy.—Kidney adherent. Pelvis distended, very thick-walled, each calyx eroded by tuberculous processes (*vide* Plate B). Ureter dilated and thickened. Healed.

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